KUPCZAK, Agata, ZAJĄC, Kacper, UCHTO, Adrian, KOZIOŁ, Mateusz, GÓRKA, Dariusz and PALACZ, Karolina Alicja. Methods of Managing Postoperative Pain in Orthopedics. Quality in Sport. 2024;35:56047 eISSN 2450-3118.
https://dx.doi.org/10.12775/QS.2024.35.56047
https://apcz.umk.pl/QS/article/view/56047

The journal has had 20 points in Ministry of Higher Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Higher Education and Science of 05.01.2024. No. 32553.
Has a Journal's Unique Identifier: 201398. Scientific disciplines assigned: Economics and finance (Field of social sciences); Management and Quality Sciences (Field of social sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 r. Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398.
Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 07.11.2024. Revised: 21.11.2024. Accepted: 26.11.2024. Published: 02.12.2024.

Methods of Managing Postoperative Pain in Orthopedics

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Abstract

Postoperative pain management is a critical concern for patients undergoing orthopedic procedures, impacting both recovery and overall patient satisfaction. Effective pain control is essential for minimizing complications such as limited mobility and delayed healing. This paper reviews contemporary strategies for managing postoperative pain in orthopedics, focusing on both pharmacological and non-pharmacological approaches. Pharmacotherapy, including nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids, is commonly utilized but must be carefully managed to prevent adverse effects such as dependence and gastrointestinal issues. Complementing these methods, non-pharmacological interventions such as physical therapy, cryotherapy, transcutaneous nerve stimulation, and music therapy offer holistic benefits without the associated risks of medication. The study emphasizes the importance of a multifaceted approach that includes early rehabilitation and patient education to enhance recovery outcomes. The combined use of diverse pain management techniques can optimize analgesic efficacy

while promoting patient comfort and reducing hospital stays, ultimately leading to improved rehabilitation results.

Keywords: pain, management, physiotherapy, manual, music, physical, therapy, cannabinoids, pharmacotherapy

Introduction

Postoperative Pain Represents a Significant Issue for Patients Undergoing Orthopedic Procedures. Effective pain management not only influences patient comfort but is also crucial for the rehabilitation process and shortening hospital stays. Inadequately controlled pain can lead to complications such as limited mobility, delayed wound healing, and the development of chronic inflammatory and pain conditions. In orthopedics, where procedures often involve major joints, bones, and muscles, this challenge becomes even more pronounced, as multi-layered interventions penetrating through multiple layers of skin and tissue provide an organic basis for persistent postoperative pain. [1]

Effective management of postoperative pain is a key component of patient care following orthopedic procedures. In response to the need to provide optimal patient comfort and minimize the risk of complications, a variety of pain relief methods have been proposed. These approaches encompass both traditional pharmacological therapies and increasingly utilized non-pharmacological methods. Pharmacological treatments include analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs), mild and strong opioids, as well as advanced local analgesia techniques, such as nerve blocks. Complementing these are non-pharmacological approaches, including the earliest possible initiation of rehabilitation, physical therapy, relaxation techniques, and most importantly patient education, which together form an essential part of a comprehensive patient care strategy. [1-5]

In recent years, significant progress has been made in postoperative pain management methods, both pharmacological and non-pharmacological. This article aims to present contemporary strategies for managing postoperative pain in orthopedics, with particular emphasis on their efficacy, safety, and impact on patient recovery. [3]

Pain Management Methods

Using broad-spectrum approaches that combine various mechanisms of action, it is possible to optimize pain control while reducing medication dosages and limiting adverse effects. The implementation of these methods not only enables better management of pain symptoms but also supports faster patient mobilization, improves quality of life, and shortens hospital stays. This section will provide a detailed overview of contemporary methods for alleviating postoperative pain in orthopedics, discussing their advantages, limitations, and applications in clinical practice.

Physiotherapy

In addition to patient rehabilitation aimed at promoting faster recovery and restoring function in the postoperative period, certain methods are also employed specifically to reduce postoperative pain. These approaches aim to improve patient comfort and enhance the effectiveness of rehabilitation. Among the methods that can be utilized are both manual techniques and physical therapy.

Physical therapy

Cryotherapy includes the use of cold compresses (ice packs, gel packs) as well as specialized cold therapy devices (cryotherapy chambers, localized cryotherapy using liquid nitrogen or carbon dioxide). The application of cold reduces inflammation and swelling, which is one of the main causes of postoperative pain. Cold therapy also slows the conduction speed of nerve impulses, which delays pain perception and reduces its intensity. [6]

Transcutaneous peripheral nerve stimulation is a method used to alleviate pain from various sources. It is also effective for patients following orthopedic procedures, helping to reduce pain symptoms. When combined with pharmacotherapy, this approach can significantly reduce the need for analgesic medications. Electrical impulses of carefully selected frequencies block nerve signal conduction, providing pain relief. This is a minimally invasive technique, with adverse effects or contraindications often varying depending on the individual patient (e.g., presence of metal implants, pacemakers). [7- 9]

Manual Therapy

Positioning techniques are an essential component of postoperative care. Their purpose is to prevent and reduce contractures, limitations in range of motion, edema, and discomfort. Proper positioning and securing of the operated area can also alleviate pain caused by irritation of the surgical site. Educating patients on appropriate ergonomic movements helps minimize the risk of injury to the operated area and reduces strain on other parts of the body.

Methods such as massage and progressive muscle relaxation are also used as part of therapy for patients after various types of surgeries, positively influencing the recovery process and rate of return to function. However, there is currently a lack of reliable, large-scale studies on the effect of these techniques on reducing postoperative pain in the early stages after surgery. [10-12]

Music Therapy

Current research demonstrates the positive effects of music therapy in alleviating pain in postoperative patients. This type of therapy has also shown benefits in reducing patient anxiety, not only by providing positive stimuli but also by serving as a distraction. Music therapy is non-invasive, safe, and easily accessible. The best results are observed when the type of music is selected based on the individual patient's preferences. [13]

Cannabinoids

One of the most extensively studied cannabinoids in medicine is marijuana. Its medical application has been researched for various conditions and ailments; however, regarding postoperative pain in orthopedics, the availability of studies is still limited both methodologically and quantitatively. Current literature does not provide sufficient scientific evidence to confirm marijuana's effectiveness in managing postoperative pain. The observed positive effects of marijuana in orthopedic pain relief have often been compared only to placebo. [14]

Pharmacotherapy

Pharmacotherapy is both one of the most effective and most frequently utilized methods of postoperative pain management. Despite common concerns regarding the risk of patient dependence on administered substances, this approach is sufficiently effective and safe to be incorporated into postoperative treatment standards. The risk of addiction and tolerance to analgesic drugs can be effectively minimized by appropriately selecting doses and types of medication tailored to the patient's needs.

In addition to alleviating pain, many medications also contain substances that reduce inflammation or calm the nervous system, which can help mitigate postoperative discomfort and anxiety—factors that can exacerbate somatic pain. In orthopedics, nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly combined with opioids. Additionally, analgesic drugs are often used in preemptive analgesia, aimed at preventing the sensation of pain by blocking pain stimuli before they occur. [1-5]

Further supportive medications, such as antiemetics, are often administered to reduce nausea and prevent vomiting. For enhanced recovery, vitamins and supplements may also be provided, depending on the patient's specific deficiencies and needs. The careful selection of substances, doses, and consideration of their interactions is crucial for maximizing patient safety and comfort. [1-3]

Due to the nature of this paper, not all available pharmacological methods for pain management will be discussed; instead, only the two most used approaches in contemporary medicine will be outlined.

NSAIDs and Opioids

Opioids, despite their high effectiveness, carry significant risks of side effects such as respiratory depression, addiction, and central nervous system dysfunction. Nonsteroidal anti-inflammatory drugs offer an alternative in the management of acute pain, providing effective relief for a variety of conditions, starting with mild pain caused by tension headaches, progressing to moderate pain resulting from injury or an accompanying illness, and occasionally severe postoperative pain, although in most cases, their intensity is insufficient to fully alleviate the pain. NSAIDs can be used alone or in combination with low doses of opioids, allowing for effective pain control while reducing the need for opioids, thereby limiting the risks associated with their use. Unlike opioids, NSAIDs do not cause respiratory depression or

have a strong impact on the central nervous system. However, their use is associated with some risks, particularly concerning the gastrointestinal tract, however, they do not differ significantly from the risks associated with the use of other short-term medications, excluding the strongest NSAIDs, which, in large doses and with prolonged use, can be harmful to the body. [15, 17] NSAIDs not only reduce the need for opioids but also improve patient comfort by effectively controlling pain and minimizing opioid-related side effects, such as nausea, sedation, or constipation. Furthermore, NSAIDs can reduce opioid consumption, thus lowering the risk of opioid dependence. Patients receiving NSAIDs after surgical procedures report better pain control, fewer side effects, and no difference in bleeding incidents compared to those taking opioids, such as codeine. This may seem surprising, as it is a well-known fact that NSAIDs can often severely damage the mucous membrane, particularly in the stomach, leading to the development of ulcers. That is why, as every pharmacological treatment carries the potential for side effects, NSAIDs should be prescribed at the lowest effective dose for the shortest period of time. Patients should be well informed about the potential risks associated with these medications, and analgesics should be chosen based on individual needs, taking into account the patient's overall health and medical history. Multimodal therapy, which combines low doses of opioids with non-opioid analgesics like NSAIDs or acetaminophen, should always be considered, as it typically provides the best results with the fewest side effects, since both substances act synergistically, allowing for their use in lower doses than would be the case with monotherapy. [15-21]

Nerve blocks

In situations where the patient experiences severe pain and none of the previous methods have provided the expected results, or when pharmacotherapy is poorly tolerated by the patient or when we want to avoid excessive drug administration, an alternative approach, although not a definitive solution to the problem, is the placement of a nerve block targeting the nerve that innervates the painful area of the body. Despite common belief, nerve blocks can be applied in various locations, such as the occipital region of the head, the jaw, the limbs, and, of course, they are frequently used for back pain. It is a temporary method, as the substances used for nerve blockade degrade over time. Only the definitive severing of the nerves in most cases provides lasting relief to the patient. However, denervation, even if not extensive, carries numerous complications, depending on the nerve involved – ranging from sensory disturbances

to muscle atrophy, therefore, it should be used with caution, taking into account the risk-benefit ratio of the procedure for the individual patient. [22-25]

Discussion

Effective management of postoperative pain following orthopedic procedures requires the implementation of diverse strategies that take into account both patient well-being and potential adverse effects. Both pharmacological and non-pharmacological methods play a significant role in the recovery process; however, their importance and prioritization should be considered differently based on the clinical situation.

Pharmacological pain relief methods, such as the use of nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and nerve blocks, are undoubtedly most effective at the time of administration and without considering their long-term effects. They are essential in situations where other approaches fail. NSAIDs reduce inflammation and swelling, opioids quickly alleviate severe pain, and nerve blocks can provide immediate relief for certain conditions over an extended period. However, these medications and methods carry risks of adverse effects, such as liver and kidney damage, gastrointestinal disturbances, opioid dependence, respiratory depression, as well as less significant reactions like allergies or drug-induced rashes. Therefore, they should be used judiciously, with dosing strictly controlled. Our choice should lean towards these options only when non-pharmacological interventions prove ineffective, except in cases of severe pain immediately after surgery, where patient immobilization and widespread tissue damage make it impossible to halt the pain. [2, 4, 5, 7]

Given these potential hazards, there is an increasing focus on non-pharmacological methods, which should be employed as the first line of defense in managing postoperative pain. Techniques such as early rehabilitation, physical therapy, relaxation techniques, massage, and the application of cold and heat are non-invasive and have no negative impact on the patient's body. Moreover, they support the healing process, mobilization, and prevent complications associated with prolonged immobility. Patient education also plays a crucial role, helping patients understand how to cope with pain and avoid actions that may worsen their condition. A patient who demonstrates a high level of knowledge and familiarity with their condition increases their responsiveness to changes in their body, enabling them to select appropriate pain management techniques. [8, 9]

The most significant advantage of non-pharmacological methods is that they focus on a holistic approach to the patient, supporting not only their physical but also their psychological well-being. Actively engaging the patient in the treatment process, including the use of relaxation or movement techniques, enhances their sense of control over their health and reduces anxiety related to pain, forming a critical component of the therapeutic process. [1-3] The highest effectiveness is achieved through the application of diverse pain treatment methods and their appropriate selection. Although pharmacotherapy shows great effectiveness, relying solely on it and lacking a thoughtful choice of applied methods can lead to undesirable outcomes, such as opioid dependence. [15]

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