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Harnessing Cannabis: Pain Management Strategies for Oncology Patients – A Narrative Review

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Abstract
Cancer-related pain represents a serious challenge in oncological care, often refractory to conventional analgesics and significantly impacting patients' quality of life. In recent years, medical marijuana (cannabis) has emerged as a potential adjunctive or alternative therapy for managing pain in oncological patients. This narrative review critically evaluates the existing literature on the efficacy, safety, and underlying mechanisms of action of medical marijuana in alleviating pain associated with cancer. Drawing upon a synthesis of preclinical and clinical studies, as well as meta-analyses and systematic reviews, this review provides insights into the scientific basis and clinical implications of utilizing medical marijuana in oncological pain management.

Keywords: medical marijuana, medical cannabis, oncological pain, pain management

Introduction

Cancer-related pain remains a prevalent and distressing symptom in oncology, necessitating effective pharmacological interventions to enhance patient comfort and quality of life. Amidst the evolving landscape of pain management strategies, medical marijuana has garnered increasing attention for its potential analgesic properties (1).

Harnessing the therapeutic potential of cannabinoids, the active constituents of marijuana, represents a novel avenue in addressing cancer-related pain (2). This review seeks to clarify the current state of knowledge regarding the efficacy, safety, and mechanistic underpinnings of medical marijuana in pain management for oncological patients.

Efficacy of Medical Marijuana in Cancer Pain Management

Three primary motivations for the utilization of medical cannabis surfaced from the analysis: ameliorating treatment-resistant nausea and vomiting, complementing pain relief strategies, and enhancing appetite and dietary intake (3). Mounting evidence from preclinical studies, clinical trials, and systematic reviews supports the analgesic efficacy of medical marijuana in alleviating cancer-related pain. Cannabinoids, such as delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD), exert their pharmacological effects through interaction with the endocannabinoid system, modulating pain signaling pathways (4). Notably, meta-analytic evidence by Lynch and Campbell (2011) underscores the superiority of cannabinoids over placebo in mitigating cancer pain, indicating a promising avenue for therapeutic intervention (5).

Additionally, medical cannabis demonstrated efficacy in ameliorating oncology patients' Edmonton Symptom Assessment System (ESAS) scores, even in conjunction with reductions in opioid dosages, thereby suggesting its potential as a viable adjunctive therapy for palliative care (6). When low doses of THC are incorporated as adjunctive therapy, we observe enhanced pain management clinically, characterized by reduced opioid requirements, improved pain-related outcomes, and mitigated opioid-associated adverse effects (7).

In a study conducted by Fehniger, Brodsky, Kim and Pothuri (2021), in a limited cohort of gynecologic cancer patients receiving medical marijuana (MM) for symptom control, self-reported follow-up assessments revealed symptomatic relief for the majority, alongside minimal adverse effects attributable to therapy. These findings hold potential significance in informing counseling sessions with gynecologic cancer patients regarding the effectiveness and tolerability profile of MM (8). Furthermore, in the context of head and neck cancers, medical marijuana demonstrates encouraging outcomes in the realm of pain management (9).

Safety Profile of Medical Marijuana

Despite its therapeutic potential, concerns regarding the safety profile of medical marijuana warrant careful consideration. A study demonstrates that certain patients perceived cannabis as safe and were unaware of the substantial variability in product quality, which is contingent upon the source (10). The predominant adverse reactions encompassed psychosis, cognitive decline, vertigo, dysphoria, xerostomia, nausea, and emesis (11). Furthermore, prolonged administration of high doses was linked to deficits in memory and psychomotor function. Consequently, cannabis consumption heightens the risk of motor vehicle accidents, suicidal ideation, and instances of intimate partner and child aggression (12). It is believed that patients should refrain from operating vehicles for a period of 8 hours if they experience a subjective "high" resulting from self-administration of smoked marijuana (13). Moreover, the extended implications of prolonged marijuana consumption include the risk of dependency.

However, research suggests that individuals who have survived cancer may utilize cannabis primarily for symptom alleviation rather than recreational purposes, prompting inquiries into the potential for dependency (14). Additionally, studies indicate that while the majority of patients reported satisfaction with cannabis use, a minority ceased usage due to adverse effects (15).

Mechanisms of Action

The recent identification of an endogenous cannabinoid system has advanced our comprehension of marijuana's mechanisms of action. The endocannabinoid system constitutes a fundamental intrinsic mechanism for pain regulation (16). Extensive distribution of cannabinoid receptors has been documented in both central and peripheral nervous system tissues (17). The cannabinoid system represents a previously unacknowledged pervasive network within the nervous system. Notably, a dense concentration of receptors is observed in regions such as the cerebellum, basal ganglia, and hippocampus, contributing to the modulation of motor function, coordination, and affective states (18).

The main phytocannabinoids comprise delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD), which exert their effects via CB1 receptors present in both the central nervous system and peripheral tissues, as well as CB2 receptors predominantly found in the immune and hematopoietic systems (19). Cannabinoids exert their analgesic effects through the activation of CB1 receptors located within the central nervous system (CNS) and nerve terminals. Additionally, peripheral CB2 receptors contribute to analgesia by inhibiting the synthesis of pain and inflammatory mediators, a mechanism of particular significance in the management of cancer-related pain (20).

Additionally, emerging evidence suggests synergistic interactions between cannabinoids and other analgesic modalities, highlighting the potential for combination therapies in optimizing pain management outcomes. The utilization of cannabis and cannabinoids through specific routes of administration may mitigate various forms of pain (21).

Administration and dosing

In the context of using medical marijuana for managing oncological pain, various factors need to be taken into consideration, notably the route of administration and dosing strategies. The choice of administration route significantly influences the onset and duration of therapeutic effects, as well as patient adherence and preferences. Common administration routes encompass inhalation (via smoking or vaporization) and oral ingestion (including edibles, oils, and capsules) (22), each offering distinct pharmacokinetic profiles. The dosing schedules for medical marijuana require customization to maximize therapeutic benefits while minimizing adverse reactions (23). Beginning treatment with low doses and gradually increasing them enables patients to adapt to cannabinoid effects while reducing the likelihood of adverse events (24).

Clinical Considerations and Future Directions

If marijuana products are to be regarded as pharmaceutical agents, then they should undergo the same scrutiny as other medications. This entails comprehensive investigation into their purity, dosage, method of administration, and therapeutic effects (25).

In the clinical context, the integration of medical marijuana into oncological pain management necessitates a comprehensive understanding of patient-specific factors, including comorbidities, medication interactions, and legal/regulatory considerations. There exists a clear necessity for enhanced scientific data reliability, comprehensive pharmacological insights, and a deeper comprehension of its mechanisms of action, alongside the availability of substantial clinical evidence to increase its utilization (26). Healthcare practitioners are advised to conduct comprehensive medical assessments, incorporating screenings for potential drug interactions or treatment contraindications, prior to endorsing its consumption (27). Oncologists, reliant on evidence-based data to inform their therapeutic approaches, express concern over the paucity of published research elucidating the therapeutic advantages of medical cannabis (28). Nevertheless, healthcare professionals are well-positioned to oversee and provide education to patients utilizing medical cannabis and cannabinoids (29).

Conclusions

In conclusion, medical marijuana represents a promising adjunctive therapy for pain management in oncological patients, offering a novel approach to addressing the multifaceted nature of cancer-related pain. While the evidence base supporting its efficacy continues to accrue, clinicians must exercise caution in navigating the complexities of cannabinoid therapy, ensuring a balanced approach to risk-benefit assessment and patient-centered care. By advancing our understanding of the pharmacological mechanisms and clinical applications of medical marijuana, we can optimize its therapeutic potential in enhancing the quality of life for oncological patients grappling with pain.

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