Medical Cannabis

The oncology nurse’s role in patient education about the effects of marijuana on cancer palliation

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**BACKGROUND:** Cannabis, also known as marijuana, is legal either medicinally or recreationally in 29 states and the District of Columbia, with a majority of the U.S. adult population now living in states where cannabis is legal for medicinal use. As an advocate for patient autonomy and informed choice, the oncology nurse has an ethical responsibility to educate patients about and support their use of cannabis for palliation.

**OBJECTIVES:** This article aims to discuss the human endocannabinoid system as a basis for better understanding the palliative and curative nature of cannabis as a medicine, as well as review cannabis delivery methods and the emerging role of the oncology nurse in this realm.

**METHODS:** This article examines the literature and uses a theoretical-conceptual method to explore the oncology nurse’s role in supporting the use of medicinal cannabis by patients with cancer.

**FINDINGS:** The oncology nurse can play a pivotal role in supporting patients’ use of cannabis for palliation.

**KEYWORDS**
cannabis; oncology; palliation; marijuana; nursing

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CANNABIS, OR MARIJUANA, IS NOW LEGAL for adult recreational and/or medicinal use in most of the United States, with 60% of the United States population residing in these states (Kasai & Trumble, 2017). Oncology nurses may have a special interest in assisting patients with using cannabis as a palliative treatment, because patients with cancer should be offered early palliation in support of better cancer treatment outcomes (Howie & Peppercorn, 2013). However, most nurses have received minimal education on how cannabis works in the body and on the nature of the oncology nurse’s emerging role in guiding patients’ use of cannabis for palliation. This article will briefly review the body’s endocannabinoid system (ECS), explore how the oncology nurse can support patient use of cannabis as a palliative option, discuss cannabis ingestion and delivery methods, and note the proper dosing of cannabis for patients with cancer.

**The Basics of the Endocannabinoid System: Cannabis as Medicine**

Nurses are ethically obligated to ensure patients’ autonomy, and the ethical standards for nurses require that high-quality care be provided to all patients, including those who use cannabis for palliation. To best advise patients with cancer about the use of cannabis as a palliative medicine, nurses must have basic knowledge of the body’s ECS. Although the ECS was discovered in the mid-1990s by Raphael Mechoulam, an Israeli organic chemist and professor of medical chemistry, it is not standard content in nursing curricula.

**The Endocannabinoid System**

The ECS is a central regulatory system of the body; it is thought to be the body’s largest receptor system, and it facilitates the body’s ability to maintain homeostasis (Abrams & Guzman, 2015). ECS receptors are found in the brain, organs (liver and pancreas), connective tissues, bones, adipose tissue, nervous system, and immune system. Humans produce their own cannabinoids (endocannabinoids) on demand, namely anandamide and 2-arachidonoylglycerol (2-AG) (Abrams & Guzman, 2015). These endocannabinoids are produced as needed, and they are not stored in the body (Grant & Cahn, 2005). Like endorphins, the human body produces endocannabinoids in response to activities such as exercise (“runner’s high” is from endocannabinoids, not endorphins), and osteopathic manipulation and acupuncture can enhance the body’s production of cannabinoids (Kendall & Yudowski, 2017; McPartland, Guy, & Di Marzo, 2014).
Cannabinoid Receptors

Cell membrane cannabinoid receptors send information backward (retrograde transmission), from the postsynaptic to the presynaptic nerve. The cannabinoid receptor type 1 (CB1) is found primarily in the brain, whereas the cannabinoid receptor type 2 (CB2) is located mostly in the immune system and in the bones; together, these are the main ECS receptors (Kendall & Yudowski, 2017), although several more are being studied. Endocannabinoids are released from depolarized postsynaptic neurons in a calcium-dependent manner, and they are not stored in the body. Anandamide and 2-AG act in retrograde fashion at the presynaptic cannabinoid receptors to suppress the release of various neurotransmitters, mainly gamma-aminobutyric acid (GABA) and glutamate. Endocannabinoids work on excitatory and inhibitory presynaptic fibers, creating either a transient or a prolonged reduction in neurotransmitters (Kendall & Yudowski, 2017). Through regulation of neurotransmitters, the ECS maintains homeostasis in the body (Russo, 2016a).

Exogenous Phytocannabinoids

Many cannabinoids are found in the cannabis plant. One of the phytocannabinoids available from cannabis is tetrahydrocannabinol (THC), which is also known as the psychoactive compound in cannabis. THC works primarily on CB1 receptors in the brain, whereas the cannabinoid cannabidiol (CBD) works mostly with the immune system and creates homeostasis around the inflammatory response through interactions with CB2 receptors; CBD, therefore, does not have the same brain-based psychoactive effects as THC (Abrams & Guzman, 2015). Other phytocannabinoids and their actions are still being studied; there may be as many as 111 cannabinoids in cannabis (Radwan et al., 2015). The human body reacts to its production of endogenous cannabinoids and to the ingestion of phytocannabinoids found in the cannabis plant (Abrams & Guzman, 2015).

Cancer and Cannabinoids

Cannabinoids have antiproliferative effects on cancer cells. In vitro studies with THC have demonstrated that cannabinoids have an impact on the migration, angiogenesis, autophagy, and/or apoptosis (programmed cell death) of cancer cells; however, each type of cancer seems to respond differently to the effects of exogenous cannabinoids (Abrams, 2016; Bowles, O’Bryant, Camidge, & Jimeno, 2012; Guindon & Hohmann, 2011). Many types of cancer cells also have a higher concentration of CB1 and CB2 receptors versus their normal cell counterparts, but this varies among types of cancer (Abrams, 2016; Bowles et al., 2012). CB2 receptors are likely more important than CB1 in mediating cannabinoid’s anti-cancer activity (Abrams, 2016; Bowles et al., 2012).

A need exists for human research about cannabis as a pain reliever and as a curative agent in regard to cancer care. Although it is known that the ECS and exogenous cannabinoids may inhibit cancer cell proliferation and angiogenesis while supporting apoptosis of cancer cells, it may also be true that ECS dysregulation may support or promote cancer cell growth and that cannabinoid medicine may prove to have human anticancer effects (Guindon & Hohmann, 2011; Russo, 2016a).

Cannabis has shown promise with treatment of refractory glioblastoma multiforme (Guzmán et al., 2006) and lung adenocarcinoma (via in vitro and in vivo studies) (Munson, Harris, Friedman, Dewey, & Carchman, 1975), as well as lymphoma, leukemia, and cancers of the breast, thyroid, prostate, colon, skin, and pancreas (Pisanti et al., 2009). However, human studies examining the use of cannabis as a first-line treatment for cancer have been limited (Abrams & Guzman, 2015).

Cannabis and Oncology Treatment and Palliation

Cancer is a qualifying condition for patients to obtain medical cannabis certification in most of the states where medicinal cannabis is legal (Bowles et al., 2012). The following website provides information about current medicinal states and their specific qualifying conditions and eligibility requirements: www.marijuandoctors.com/medical-marijuana.

Although cannabis is used for palliation in cancer, symptom relief may vary based on the cannabis strain used, the product preparation process, the state of the individual’s ECS, and the ingestion method (e.g., vaporization of cannabis flower, ingestion of cannabis oils and cannabis tinctures, use of pharmaceutical synthetic cannabinoids) (Brunt, van Genugten, Höner-Snoeken, van de Velde, & Niesink, 2014; Piper, 2017; Russo, 2016b). The benefits of using whole-plant cannabis medicine instead of synthetic formulations of cannabinoids are just beginning to be explored. The 400-plus compounds in cannabis, including the cannabinoids and terpenes, likely work together to create a synergistic effect that exceeds the expected contributions of any one of the cannabinoids being used alone (Russo & Marcu, 2017).

Cannabis is a palliative medicine that can provide analgesia, enhance appetite, address anorexia, and help to manage nausea. Because of the long prohibitory history of cannabis, nurses may need to overcome stigmas and fears around its use.
and vomiting (Abrams, 2016; Abrams & Guzman, 2015; Bowles et al., 2012; Smith, Azariah, Lavender, Stoner, & Bettiol, 2015; Ware, 2016). In addition, cannabis can help to create a positive mood, develop an intent for healing, boost energy, reinforce positive sleep habits, and enhance social interactions (Rahn, 2015); all of these are important components of a patient’s self-care and holistic healing processes. Cannabis can be used to address chronic pain and neuropathic pain (Hill, 2015), both of which can be side effects of cancer treatment.

To date, cannabis is considered to be a safe treatment option for selected symptoms associated with cancer diagnosis or treatment. The literature does not report any incidence of overdose or death from cannabis ingestion. Abrams and Guzman (2015) noted that cannabis use is safe and effective when administered with opioids, providing a means to limit opioid dosing.

**Cannabis Strains**

Indica and sativa are the two broad types of cannabis plants, each with various levels of THC and CBD. These two types have different effects on the body, and patients may need help in choosing a strain that works best for them at any given time (Brunt et al., 2014; Piper, 2017). Patients may react differently to different types of cannabis medicine, so “starting low and going slow” (using a small dose and taking one’s time before increasing dosage) when trying new strains becomes important for successful palliation (Childs, Lutz, & de Wit, 2017). All nurses and patients should be aware that cannabis has a synergistic effect with opioids and may enhance opioid effectiveness without affecting brain stem function (very few cannabinoid receptors are in the brain stem) (Abrams, 2016). Overall, patients should consider all the categories of cannabis strains before making a selection.

Choosing the best medical cannabis strain for a particular condition that works for any given patient can take some trial and error, and patients and nurses must be thoughtful and open to this process of finding the best fit for the particular patient, given his or her current symptoms. Considerations include THC percentage versus CBD percentage of various strains and the recommendation to keep doses low (E. Russo, personal communication, October 30, 2017; Russo, 2016b).

**SATIVAS:** *Cannabis sativa* is a taller plant with thin pale green leaves that tends to have a greater concentration of THC (Atakan, 2012; Clarke & Merlin, 2016). In addition, *cannabis sativa* is complex, with more than 400 chemical components and 60 cannabinoid compounds. Sativas can create a cerebral or mind high when ingested. In addition, they may enhance focus, creativity, energy, and serotonin levels, and they have an uplifting quality that may facilitate completion of daytime activities (Piper, 2017).

**INDICAS:** *Cannabis indica* is a shorter plant with dark, broad green leaves that typically has a higher CBD content and lower THC content than *cannabis sativa* (Atakan, 2012). This plant may create more of a sensation of full-body relaxation and promotes sleep, relieves nausea, and stimulates the appetite. Indicas may give the feeling of a “body stone,” or of extreme muscular relaxation, with heaviness and sedation (Clarke & Merlin, 2016; Piper, 2017). Patients with cancer may opt for this type of cannabis to help them sleep, eat, relax, and manage pain and the many stressors associated with being a patient (Piper, 2017). Common side effects associated with indica strains include sleepiness and “couch lock,” where the person feels content to remain sedentary and at rest; as a result, these strains are often best used in the evening (Karila et al., 2014).

**HYBRIDS:** Hybrids are strains that have been grown to capture the best of the sativa and indica strains (Clarke & Merlin, 2016).

**Side Effects**

The acute effects of cannabis are generally perceived as relaxing and pleasurable, with an increased sense of well-being and euphoria (Russo, 2016b). However, cannabis is not without its side effects, which may include dysphoria, anxiety, panic, impaired memory, decreased psychomotor performance, impaired cognitive capacity, tiredness, dizziness, tachycardia, dry mouth, dry eyes, and a distorted perception of the passage of time (Grottenhermen & Müller-Vahl, 2012; Kramer, 2015; Schrot & Hubbard, 2016). Chronic side effects may include cannabis use disorder, cannabis hyperemesis disorder, cognitive impairment, and chronic bronchitis (Karila et al., 2014; Schrot & Hubbard, 2016).

If a patient is experiencing side effects, the following possibilities exist (Russo, 2016b):

- A different strain or variety may be needed.
- The patient may need to focus on starting low and going slow with dosing.
- The patient may need to understand that, over time, tolerance may develop and side effects may lessen, as well as that using cannabis with other cannabinoids, primarily CBD, helps to manage side effects related to THC (Russo, 2016b).

An example of this is that people often experience more anxiety or paranoia with sativa strains or strains with a high THC percentage, whereas they may experience minimal side effects when using indica strains or strains with more CBD and less THC. If the patient is experiencing more severe side effects (e.g., nausea and vomiting, aural or visual hallucinations), he or she should be advised to remain calm, rest, and stay hydrated and told that the side effects generally pass within a few hours. Typically, medical intervention is not required, although ingestion of CBD may help to lessen the side effects often associated with THC (Russo, 2016b).

**Ingestion and Delivery Methods**

Cannabis can be ingested via a variety of methods (e.g., smoked in a joint, via a water bong or pipe). The advantage of inhaling cannabis is that the medicine begins to work almost
immediately; vaporizing instead of smoking helps the patient to avoid harmful combustion byproducts of smoking (Russo, 2016a). In some areas of the country, dose-metered vaporizers are available, so patients can access a known amount of medicine safely (Russo, 2016a).

Cannabis can also be supplied in tinctures, edibles (e.g., baked goods, candies, any food prepared with an oil or butter), or via cannabis oil capsules (Barrus et al., 2016). The cannabis plant must be heated (decarboxylated) to release THC (Russo, 2016b). The advantage of oral consumption is a slower onset and longer duration of the medicinal properties of cannabis, whereas the advantage of inhaling cannabis is the more immediate relief of symptoms, such as nausea and pain (Barrus et al., 2016). Rectal suppository is a trending method for cannabis ingestion, but its efficacy has not yet been thoroughly studied. Some patients will juice raw cannabis leaves to receive the benefits of the many cannabinoids and other cannabinoid components in the plant, such as terpenes, without experiencing the high that comes from heating THC.

Prescription Cannabinoid Medications
Prescription synthetic medications containing cannabinoids include dronabinol (Marinol®), which is synthetic THC in sesame oil that is frequently administered prior to chemotherapy treatments (Prescribers’ Digital Reference, n.d.). Other cannabis medications are under investigation and seeking U.S. Food and Drug Administration approval; these include nabiximols (Sativex®) spray (THC and CBD derived from whole cannabis plants) and cannabidiol (Epidiolex®) (CBD for seizures) (Giacoppo, Bramanti, & Mazzon, 2017; GW Pharmaceuticals, n.d.).

Dosing
Patients who are using cannabis for palliation should access medicine that has been tested for pesticides and heavy metals, and the ratio of THC to CBD should ideally be known. Generally, 2.5 mg of THC is a dose that is appropriate for patients who are cannabis naive, whereas 5 mg of THC is needed as a moderate dose for people with some tolerance, and 10 mg of THC...
is a large dose that could be problematic for the cannabis-naive person (Russo, 2016b). Higher doses (more than 15 mg) may be appropriate for some patients as their THC tolerance increases (Russo, 2016a). However, these larger doses increase the risk for uncomfortable side effects, and the general recommendation is for patients to “start low, go slow, and stay low” (E. Russo, personal communication, October 30, 2017). Overall, THC dosage should be limited to 30 mg per day for palliative effects and used in conjunction with CBD and other cannabinoids when possible to help modulate the psychoactive effects of THC alone (E. Russo, personal communication, October 30, 2017). Patients may need to use multiple delivery methods to manage symptoms, such as an edible or tincture taken after vaporizing to ensure continued management. More research on dosing and administration needs to be completed, so dosing practices can be based on valid and reliable scientific evidence (Birdsall, Birdsall, & Tims, 2016).

For inhaled cannabis, patients should try one inhalation every 15–30 minutes until the symptom management goal is met. A patient does not have to feel euphoric to reach palliative goals; having CBD on hand will help to manage any side effects, particularly with daytime use or when a patient has to drive (E. Russo, personal communication, October 30, 2017). Ingestion of cannabis via edibles or tinctures can have varying effects, depending on how much the patient has eaten. However, these modes of ingestion will provide a greater duration of medicinal benefit and should be used to support chronic symptom management (E. Russo, personal communication, October 30, 2017).

Medication Interactions
Cannabis can increase the risk of bleeding when taken with medications such as aspirin, warfarin, heparin, clopidogrel, and nonsteroidal anti-inflammatory drugs, such as ibuprofen and naproxen (Mayo Clinic, 2017). Cannabis can lower blood sugar and blood pressure, and it may also lower the liver’s cytochrome P450 enzyme, affecting how other herbal supplements may be metabolized (Mayo Clinic, 2017).

Contraindications
Cannabis use is generally contraindicated in pregnancy, breastfeeding, psychosis, unstable cardiac patients, and addiction, whereas smoking should be avoided by those with chronic obstructive pulmonary disease and asthma (Russo, 2016b).

The Nurse’s Role
The role of nurses related to patients’ use of cannabis for palliation is an emerging one. This article examines how the nursing process can be used to work with patients with cancer who are using cannabis or are interested in using cannabis. Figure 1 depicts the oncology nurse’s holistic role when applying the nursing process to working with patients who use cannabis medicinally.

Although humans have been using cannabis safely for many years, nurses need to enhance their knowledge around how best to guide patients’ safe and effective use of cannabis for cancer palliation. Because most nurses are not taught about the ECS while in school, they should educate themselves about this body system. This may include self-study and scrutiny of the evidence-based literature on cannabis, as well as continuing education to further their knowledge about the ECS and cannabis use.

Conclusion
The science of cannabis use for cancer treatment and palliation is still emerging, but as the body of evidence grows, nurses may be on the front lines of facilitating patients’ choices with this palliative medicine. Nurses have the opportunity to directly support, educate, and monitor patients’ oncology palliation process, of which cannabis can play a substantive role. As the most trusted profession, nurses are ethically obligated to support patients’ autonomy as they determine what palliative modalities they would like to use. Because of the long prohibitory history of cannabis, nurses may need to overcome stigmas and fears around its use; this can be accomplished through empowerment and knowledge. Patients and nurses sharing their successes and challenges with the use of cannabis for palliation, while having open and frank discussions about cannabis used for this purpose, may help to move patients and nurses beyond cannabis prohibition–based stigma and toward a positive perspective regarding the cannabis plant as an effective component of the oncologic palliation plan.

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