Pharmacology Matters

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SHOULD WE PROCEED? IMPLICATIONS OF MARIJUANA USE FOR GI ENDOSCOPY PROCEDURES

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arijuana is derived from the plants of the genus Cannabis and is the most popular illicit drug in the United States, with more than 36 million users. Cannabis has a long history of recreational, spiritual, and medicinal use. Cannabis medicinal use can be traced back to the early 1800s, and marijuana was still in the nation's pharmacopeia until 1941 (Horvath, Dalley, Grass, & Tola, 2019). Currently, marijuana medicinal use is legal in 33 states, but federally, marijuana is an illegal substance and is listed as a Schedule I substance under the Controlled Substances Act. This federal prohibition limits research on the anesthetic implications of cannabis use. Compounding the difficulty in marijuana research is the number of extractable compounds found in cannabis (>500), the number of active metabolites, the variety of plants, and the increased concentration of delta-9-tetrahydrocannabinol (THC) in certain strains. Common nicknames for marijuana include weed, herb, pot, grass, bud, ganja, and Mary Jane. Marijuana can be smoked (joints, pipes, bongs, blunts, or vaporizers) and used in topical treatments, sublingual and oral pills, and edibles (Alexander & Joshi, 2019). The potency of marijuana has increased dramatically over the last two decades. Today's marijuana is not your grandparents' pot.

The Endocannabinoid System

Cannabinoids are endogenous in humans, with the endocannabinoid system being one of the most widespread systems in the human body playing an important neuromodulatory role. The endocannabinoid system receptors (CB_1 and CB_2) and neurotransmitters are involved in the homeostasis of several systems involving stress, pain, and inflammation. CB_1 receptors are found not only in the peripheral nerves, spinal cord, and brain but also

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in the heart and blood vessels. CB₂ receptors are expressed in the cells of the immune and hematopoietic system. CB receptors can be stimulated by the body's endogenous cannabinoids or by plant-derived or synthetic cannabinoids. The most abundant and wellstudied nonendogenous cannabinoids are THC and cannabidiol (CBD). Psychoactive effects of THC influence mood, consciousness, and behavior. Psychoactive effects of CBD can decrease pain, anxiety, and depression, and many patients use CBD for pain and anxiety relief. For healthcare providers, the primary concern with CBD use is the anticoagulation effect. If used with other blood thinners such as warfarin, increased anticoagulation can occur. Bioavailability of THC peaks within 10 minutes after inhalation. Oral bioavailability is low, and the onset of action is 0.5-2 hours, resulting in a longer duration of action. Oral mucosal sprays, topical creams, and oils are also available (Tapley & Kellett, 2019).

Medicinal Use of Cannabis

Marijuana research has focused on the gastrointestinal system for nausea and vomiting treatment, sleep, posttraumatic stress disorder, and chronic pain relief. Recent systematic reviews and meta-analyses have shown a limited reduction in chronic pain scores accompanied by significant side effects from cannabis such as dysphoria and anxiety. Even though there is evidence for the use of cannabis for chronic pain, there is no evidence for use with acute pain. Recent research is supportive of cannabinoid use for nausea and vomiting. Additional research shows possible use in sleep disorders and the reduction of spasticity and pain in multiple sclerosis (Tapley & Kellett, 2019).

Marijuana Effects of Concern for Endoscopy Nurses

Central nervous system (CNS) effects commonly reported by marijuana users include euphoria and decreased anxiety. Negative CNS effects include dysphoria, dizziness, panic, confusion, disorientation, anxiety, impaired learning and memory, psychosis, and psychomotor slowing. These effects may be potentiated by CNS suppressant drugs such as opioids or benzodiazepines. Nurses should titrate these medications with additional care in patients using marijuana and adjust the dosage and timing accordingly.

Cardiovascular effects from marijuana use are a significant concern for anesthesia and procedural nurses. Marijuana not only causes tachycardia but also causes bradycardia, postural hypotension, increased cardiac output, and increased myocardial oxygen demand. CBD does not have these effects. Marijuana use in the last hour is linked to fivefold increased risk of cardiovascular events such as acute coronary syndrome and strokes. This risk is probably related to the increased catecholamines in the bloodstream after marijuana use (Huson, Granados, & Rasko, 2018). These patients should not undergo elective procedures for at least an hour, and only when tachycardia and other signs of acute intoxication have resolved (see Table 1).

There remains conflicting research in the literature regarding the dangers of cannabis use on the cardiovascular system. Johnson-Sasso, Tompkins, Kao, and Walker (2018) completed a retrospective analysis of more than 1 million charts on marijuana users with acute myocardial infarction (MI). Their surprising results showed that marijuana had a protective effect on patients who experienced an MI, including that these patients were significantly less like to die, experience shock, or require an intra-aortic balloon pump. More research is needed to define whether marijuana is detrimental or has a protective effect on the cardiovascular system.

Chronic respiratory effects may include bronchitis, cough, emphysema, and airway hyper-reactivity, similar to long-term tobacco smokers. There are case reports of uvular edema. THC vaping has been reported to cause severe respiratory disease. Patients with a history of vaping THC should be evaluated for any signs of respiratory distress (Huson, Granados, & Rasko, 2018).

Preprocedure Instructions for Patients Using Marijuana

The most concerning procedural implication is acute intoxication. Patients should be cautioned against using marijuana on the day of the procedure or within 8 hours before arrival. Long-term users should not stop marijuana use abruptly because signs of acute withdrawal can develop within a day of cessation for high-dose, long-term cannabis users (see Table 1).

Arrival at the Endoscopy Center

On the day of the procedure, the patient should be queried for the recent use of inhaled or oral products and evaluated for acute intoxication and acute withdrawal (see Table 1). Inhaled products require a 1- to 2-hour delay, and oral use requires an 8-hour delay both for nil per os (NPO) adherence and to allow the cannabis effects to dissipate. THC slows gastric emptying an average of 30–120 minutes; therefore, recent NPO status should be thoroughly investigated.

Procedural Considerations

Unfortunately, there is little research on the effects of marijuana on anesthesia. Marijuana animal studies cannot be extrapolated to humans because different species have reacted quite differently to marijuana. In humans, studies have shown a higher requirement of propofol for induction of general anesthesia. For maintenance of general anesthesia, anecdotal reports

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TABLE 1. Signs of Acute Marijuana Intoxication and Acute Marijuana Withdrawal

Signs of acute marijuana intoxication Tachycardia, hypertension, postural hypotension, increased respiratory rate,

nystagmus, ataxia, slurred speech, escalating anxiety, paranoia, or psychosis

Signs of acute marijuana withdrawal

Headache, restlessness, irritability, anger, aggression, nervousness insomnia, abdominal cramping, tremors, sweating, fevers, and chills

support the need for higher doses of volatile agents. Of note, cannabis users report higher pain scores, require more rescue analgesics after surgery, and have poorer sleep (Alexander & Joshi, 2019). Nurses should remember that the patient's response to any cannabis product may vary tremendously due to the various THC concentrations in different strains of marijuana and each patient's variable response to marijuana. Postprocedure, observe for acute marijuana withdrawal symptoms in the long-term, high cannabis use patient.

Should We Proceed? Acute Marijuana Intoxication

Patients may be extremely nervous undergoing a medical procedure and use marijuana to decrease anxiety immediately before arrival. Nurses should inquire about recent use and assess for signs of acute intoxication (see Table 1). Acute intoxication has a higher risk of acute coronary syndrome, especially in patients with coronary artery disease. Fortunately, delaying the procedure for 1 hour and waiting for resolution of tachycardia and postural hypotension should be sufficient for the procedure to continue safely the same day. Laboratory testing will show any marijuana use in the last 30 days and has no benefit in the decision-making process for canceling or proceeding with the procedure. No other baseline studies are recommended in the patient using marijuana.

Conclusion

Most patients who are using cannabis can be safely sedated. Patients should be cautioned against using marijuana on the day of the procedure or within 8 hours before arrival. Patients who are acutely intoxicated or have used marijuana within the last hour should not go through an endoscopy procedure until signs of acute intoxication have resolved. During sedation, the nurse should titrate medicines carefully and adjust dosages and timing based on the patient's response.

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