

## **Analgesia and Anesthesia for the Substance Use Disorder Patient** *Practice Considerations*

### **Introduction**

In the United States approximately eight to ten percent of people ages 12 or older are addicted to alcohol or other drugs.<sup>1</sup> Deaths from drug overdose have more than quadrupled over the past 15 years, due initially to the over-prescription of pain medications and now due to controlled prescribing, and the use of street drugs laced with fentanyl compounds.<sup>2-5</sup> While opioids are effective analgesics, they have significant risk factors such as potential abuse and overdose. Irresponsible prescribing of opioids can lead to patients using in higher doses than intended, for purposes other than prescribed and unused drug left to be diverted. In addition, once patients run out of prescribed medications, they may use medications prescribed for someone else, or turn to less expensive and readily available illicit drugs such as heroin.<sup>3,6,7</sup>

The National Institute on Drug Abuse estimates that about 21-29 percent of patients who are prescribed opioids for pain will misuse them, with 8-12 percent of those patients becoming developing opioid use disorders.<sup>8</sup> With the rates of substance use disorder and overdose on the rise, anesthesia professionals may encounter more patients with active substance use disorder, on medication-assisted treatment or in abstinent recovery who require surgery and procedures that involve analgesia and anesthesia.<sup>9</sup> The purpose of this document is to offer practice considerations for the anesthesia professional to provide safe care of the patient with substance use disorder, whether alcohol or drugs. Considerations include preanesthesia assessment and evaluation, developing a plan of care in collaboration with the patient and the interdisciplinary healthcare team, deploying an opioid-sparing multimodal approach to managing pain, and responsible oversight that includes safe prescribing practices and discharge planning to provide a patient-centered approach to care.

### **Substance Use Disorder and Recovery**

Substance use disorder is a chronic brain disease characterized by the recurrent use of substances (e.g., alcohol, drugs).<sup>1,10</sup> The disease disrupts the brain's normal circuit of reward, withdrawal, memory, and motivation causing progressive, neurological and physiological changes related to judgement, decision making, learning, memory, and behavior control.<sup>1,10</sup> It can be classified as mild, moderate, or severe, depending on the level of clinical and functional impairment. Substance use disorder may cause health problems, disability, and failure to meet major responsibilities at work, school, or home.<sup>1,10</sup> Social stigma may further increase fear and isolation to contribute to a cycle of deep depression, poor hygiene, erratic sleep patterns, and high stress levels.<sup>11</sup>

### **Stages**

Substance use disorder has three stages: binge/intoxication, withdrawal/negative affect, and preoccupation/anticipation.<sup>1</sup> The stages occur in a cycle and affect major areas of the brain and key neurotransmitters. The cycle becomes more severe as a person continues to use addictive substances, and produces dramatic changes in brain function reducing ability to voluntary control substance use.<sup>2</sup> The three stages are described in more detail below.

- **Binge/intoxication stage:** individual consumes addictive substance, experiencing pleasurable effects. Brain reward systems positively reinforce substance use, and as the individual uses substance(s) more frequently, requires more to experience the same pleasurable effects.<sup>1,2</sup>
- **Withdrawal/negative affect stage:** brain reward systems activate stress neurotransmitters, which provide a powerful neurochemical basis for the negative physical and emotional state associated with withdrawal.<sup>1</sup>
- **Preoccupation/anticipation stage:** over-activation of the prefrontal cortex promotes cravings and leads to compulsive substance seeking, restarting the binge/intoxication stage.<sup>1</sup>

### *Treatment*

While there is no cure for substance use disorder, achieving short-term and lifelong recovery is possible and is the goal of treatment.<sup>1,12</sup> Individuals may seek support for recovery through inpatient or outpatient treatment programs that utilize modalities such as counseling, cognitive behavioral therapy and medication-assisted treatment (MAT). MAT incorporates medications such as methadone, buprenorphine, and naltrexone to address the underlying physiologic cravings of addiction, and optimizes recovery when used in combination with behavioral therapies and counseling.<sup>13,14</sup> These medications normalize and stabilize the perturbations resulting from addiction, and enable the patient to use their time productively.<sup>2</sup> Considerations for providing anesthesia and analgesia to the MAT patient is provided on page 6.

### *Recovery*

Recovery is a lifelong process that benefits from counseling and a program long after completion of the treatment process.<sup>1,15,16</sup> Challenges to achieving and maintaining sobriety that contribute to the threat of relapse include stigmatization, lack of social support, unaddressed physical and mental comorbidities, unresolved pain, cues associated with drug use, stress and exposure to substance(s) of choice.<sup>14</sup> Relapse can be dangerous, as tolerance for substances often decreases after long periods of sobriety and may lead to overdose and/or death.<sup>2</sup> Experiencing pain and exposure to stimuli associated with former substances of choice can be a significant trigger for relapse. The following considerations may help patients prevent relapse and sustain sobriety:

- Individual or group therapy.
- Participation in a recovery 12-step community program that includes a sponsor and support system (e.g., alcoholics anonymous, narcotics anonymous).
- Addressing comorbid conditions that may impact recovery such as psychiatric conditions, obesity and chronic pain.
- Living in a substance-free environment.
- Monitoring by a healthcare professional or monitoring program (e.g., text message check-ins, calls) that includes drug testing.
- Long-term treatment with appropriate pharmacotherapy (MAT).

### **Anesthesia Care Considerations for Patients with Substance Use Disorder**

Patients may present for anesthesia and analgesia care acutely intoxicated or in withdrawal, in the early stages of treatment, receiving MAT, or in drug-free recovery.<sup>17</sup> Substance use disorder patients do not pose an absolute contraindication to treatment with controlled

substances such as anesthetics and opioids, however, precautions should be taken to mitigate or avoid exposure to these substances to prevent relapse.<sup>11,18,19</sup> Collaboration with the patient, their addiction professional and the interdisciplinary healthcare team is critical to continuity of recovery while managing their pain and maintaining sobriety.<sup>20,21</sup> Additional considerations for providing analgesia and anesthesia care for the substance use disorder patient are described in more detail in the following sections.

### ***Preanesthesia Assessment and Evaluation***

A comprehensive preanesthesia assessment and evaluation provides the patient and interdisciplinary health care team with insight necessary to develop the optimal plan of anesthesia care, anticipate potential side effects and complications, and provide effective post procedure analgesia. The American Association of Nurse Anesthetists (AANA) practice considerations [Documenting Anesthesia Care, Practice and Policy Considerations](#)<sup>22</sup> recommend a comprehensive preanesthesia assessment and evaluation of the patient's general health, along with allergies, current medication use and history, preexisting conditions, and anesthesia history for a patient-specific plan for analgesia and anesthesia. Consider select diagnostic tests to assess status of known health issues (e.g., coagulation panel, liver function, bloodborne pathogen, urine drug screen, pregnancy) if the patient has certain health conditions, medical history indicates need, and is warranted by the procedure.<sup>23,24</sup>

Additional information regarding individual health and substance use history includes and is not limited to:<sup>18,25</sup>

- Current prescribed medications, including MAT and herbal supplements.
- Past anesthesia history.
- Co-occurring health conditions (e.g., hepatitis C, HIV, cardiomyopathy, mental health disorders) and adherence to prescribed medications and treatment regimens to address co-occurring health conditions (e.g., antihypertensives, MAT, physical therapy).<sup>25,26</sup>
- Type of substance(s) and/or prescription medications that were/are being abused.
- Last time of substance use, known triggers for substance use, length of abstinence period and recovery history, if applicable.
- Pattern of substance use (e.g., dose, frequency, route, length of use).
- Current level of pain, pain and analgesia experience. Patients may over report pain due to fear of being undertreated or under report pain due to fear of receiving an opioid.<sup>9</sup>
- Social support.

### ***Identification of and Screening for Substance Use Disorder***

Many reasons can make it difficult for the patient to disclose their history of substance use disorder or recovery status. Furthermore, they may be unaware of their issue with substance use disorder. They are often related to embarrassment, shame, stigma, and/or fear of prosecution.<sup>9,21,26,27</sup> The following practices handled in a respectful manner may help to establish trust to acquire an accurate and complete health and substance use history.

- Explain how complete health information provides a strong foundation to create the plan for anesthesia and pain management for best outcomes.
- Include the patient's sponsor or someone they trust.

- Communicate with the patient in a nonjudgmental tone and active listening.<sup>28,29</sup>
- Assure the patient your questions will not be used to bring criminal charges.<sup>30</sup>

Anesthesia professionals may suspect impairment and/or addiction if the patient presents with overt signs of use such as dilated pupils, alcohol odor, tremors, and deteriorated physical appearance (e.g., needle track marks, poor dentition).<sup>31</sup> Not all patients may show overt signs and symptoms of drug or alcohol use and be forthcoming regarding their addiction history. When substance use disorder and impairment is suspected, consider screening for substance use disorder using validated clinical assessment tools.<sup>32,33</sup> Screening individuals for substance use disorder can help identify those at risk and help them get the treatment they need. While no universal screening tool exists, a list of validated screening tools can be found on the National Institute on Drug Abuse (NIDA) [Chart of Evidence-Based Screening Tools for Adults and Adolescents](#) and on [www.aana.com](http://www.aana.com).<sup>34</sup> Consider selecting a tool appropriate for the patient and suspected substance (e.g., adolescent vs. adult). If a positive preanesthesia substance use screen occurs, consider providing a referral or appropriate resources for follow-up with behavioral health and addiction treatment to address risk behaviors and prevent or treat dependency and substance use disorder.<sup>35</sup>

### ***Patient Education, Plan for Anesthesia Care and Informed Consent***

The anesthesia professional, in partnership with the interprofessional healthcare team when indicated, develops the plan of analgesia and anesthesia care with the patient as an engaged, informed and active decision-maker.<sup>20,21,36</sup> The informed consent process provides an opportunity for the anesthesia professional and the patient to share information to explore patient needs, preferences, previous experiences, and concerns.<sup>37-40</sup> The AANA document, *Informed Consent for Anesthesia Care*<sup>41</sup> provides additional details regarding the elements of informed consent.

Involving the patient in the development of their analgesia and anesthesia plan increases their understanding of the goals and timeline for care, potential risks associated with the procedure, and understanding of reasonable pain expectations. Discuss, as appropriate, the following during the informed consent discussion with the patient:<sup>11,25,27</sup>

- Patient expectations and concerns related to the procedure and pain.
- Opioid free or sparing multimodal pain management options, which may include local or regional anesthesia, peripheral nerve blocks, and alternative therapies to eliminate or minimize the need for postoperative rescue opioids.
- Risks and strategies to prevent substance use disorder relapse post procedure, discussed in *Postoperative Considerations and Relapse Prevention* section of this document.
- If rescue opioids are required, establish a treatment agreement that holds the provider and patient accountable for opioid dosing, tapering off, and discard of opioids.
- Discharge planning and social work support to provide appropriate referrals, especially if the patient does not have an addiction professional or primary care provider.<sup>27</sup>
- Encourage the patient to engage or remain in a recovery program, with or without MAT. If the patient reveals that they are sober or express the desire to get sober, congratulate them on their achievement.

Conduct discussions when the patient's family, sponsor or other support persons present in compliance with the patient's consent and wishes and applicable healthcare privacy laws. Consider patient and family demographics, sociocultural factors and health beliefs during the informed consent process.<sup>41</sup> When communicating with the patient, considerations include family structure, socioeconomic status, religion, immigration status, disease history, and decision-making styles (e.g., familial, individual, delegated, deferential). Modify the language and pace of the discussion to meet the patient's level of understanding, and verify that the patient understands the information that has been shared. Family members should not act as medical translators. Instead, access available facility resources, such as translation and language assistance services, to provide information in the patient's spoken or visual language in compliance with applicable law.

### ***Analgesia and Anesthesia***

Effective analgesia and anesthesia care for the substance use disorder patient involves managing the physiological and psychological implications of substance use, managing withdrawal, and preventing relapse.<sup>25</sup> The anesthesia and analgesia requirements of the patient will vary based on anticipated and actual pain experience, current medications including MAT, co-morbid conditions including chronic pain, and type of procedure.<sup>17,19,42,43,44</sup> Appendix A, provides an overview of substance specific physiologic implications and considerations for analgesia and anesthesia. General considerations for providing anesthesia and analgesia to the substance use disorder patient are described in more detail below.

- If the patient presents for the procedure intoxicated, delay or reschedule anesthesia and the procedure, if possible.<sup>14</sup>
- Mitigate opioid use and incorporate drugs with minimal or non-hepatic metabolism, when possible.<sup>44</sup>
- Be aware of increased risk of patient complications such as:<sup>2,18,28,30,45</sup>
  - Aspiration
  - Generalized edema
  - Compromised airway
  - Venous thrombosis
  - Subcutaneous abscess
  - Lymphadenopathy
  - Hepatomegaly
  - Hemodynamic instability
  - Encephalopathy
- When acute opioid use is known, consider potential for increased tolerance to opioids and anesthetics, which may require higher than normal doses.

### ***Enhanced Recovery After Surgery and Multimodal Pain Management***

Utilizing Enhanced Recovery after Surgery (ERAS) protocols that include multimodal pain management enhances the delivery of patient-centered care to reduce surgical stress response and limit the need for an opioid to facilitate rapid recovery via early mobilization and proper nutrition. For more information on ERAS protocols, review the AANA document, [Enhanced Recovery After Surgery](#).<sup>46</sup>

According to the 2016 National Pain Strategy, multimodal pain management “addresses the full range of an individual patient’s biopsychosocial challenges, by providing a range of multiple and different types of therapies that may include medical, surgical, psychological, behavioral, and integrative approaches as needed.”<sup>47</sup> Anesthesia professionals integrate multimodal pain management as an element of ERAS protocols to manage pain. Management occurs from pre-procedure to post-discharge using opioid sparing techniques such as regional anesthesia, peripheral nerve blocks, non-pharmacologic approaches, and non-opioid based pharmacologic measures, described in Table 1.<sup>48-50</sup> ERAS pathways utilize multimodal pain management to reduce the use of opioids and shorten overall hospital length of stay.<sup>51-53</sup> The AANA document, *Enhanced Recovery After Surgery*,<sup>46</sup> provides specific considerations for classes of medications and local anesthetic techniques to create procedure specific enhanced recovery pathway.<sup>49</sup>

Anesthesia professionals should evaluate the risks and benefits of multimodal approaches based on the complexity of the surgical procedure, patient pain experience history and preferences, medical history, anticipated level of postoperative pain, risk of side effects, and duration of action of analgesics and local anesthetics when deciding on pain management options to develop individualized care for substance use disorder patients.<sup>11,24</sup> This method may eliminate or significantly reduce the use of opioids and adverse side effects such as respiratory depression, postoperative nausea and vomiting (PONV), and delayed return of gastrointestinal function. Other benefits include early mobilization, decreased length of stay, faster functional recovery, decreased pain scores, and increased patient satisfaction.<sup>31,54</sup>

**Table 1.** Non-opioid adjuvants for multimodal analgesia and anesthesia<sup>26,55-58</sup>

<b>Technique</b>	<b>Considerations</b>
<b>Pharmacologic</b>	<ul style="list-style-type: none"> <li>• Steroidal and non-steroidal anti-inflammatory agents (NSAIDs)</li> <li>• Anticonvulsant</li> <li>• Sedatives</li> <li>• Muscle relaxants</li> <li>• Acetaminophen</li> <li>• Antispasmodics</li> <li>• NMDA- receptor antagonists</li> <li>• COX-2 inhibitor</li> <li>• Systemic <math>\alpha_2</math> agonist</li> </ul>
<b>Local and Regional Anesthesia</b>	<ul style="list-style-type: none"> <li>• Local infiltration with local anesthetic</li> <li>• TAP Block</li> <li>• Peripheral nerve block</li> <li>• Continuous nerve block</li> <li>• Neuraxial block</li> </ul>

***Patients Receiving Medication Assisted Treatment<sup>13</sup>***

Currently, there are five medications approved by the US Food and Drug Administration (FDA) to treat alcohol and opioid use disorders: methadone, buprenorphine, naltrexone, disulfiram, and acamprosate.<sup>2</sup> Methadone and buprenorphine address opioid use; disulfiram, and acamprosate are used for alcohol use; and naltrexone can be for both alcohol and opioids.<sup>2</sup> The perioperative period is not an appropriate time to taper, discontinue or abruptly change a MAT regimen.<sup>25,36</sup> Before the procedure, consult with the patient’s addiction professional and/or

MAT prescriber to assess the risks and benefits of continuing or discontinuing MAT for each patient on an individual basis.<sup>36,59,60</sup> Patients on MAT may require the addition of a rescue opioid at a higher dose than normally used.<sup>11,26,61</sup>

Table 2 provides considerations for providing anesthesia and analgesia to the patient on a MAT regimen. Note that these considerations are current at the time of this correspondence, but are subject to change as addiction medication practices are evolving.

**Table 2.** Anesthesia considerations for the MAT patient<sup>13,27,36,59,61,62</sup>

Treatment	Uses	Anesthesia Considerations
<b>Acamprosate</b>	Alcohol Use Disorder	<ul style="list-style-type: none"> <li>• No known anesthesia implications at this time</li> </ul>
<b>Buprenorphine</b>	Opioid Use Disorder	<ul style="list-style-type: none"> <li>• Partial opioid-agonist <b>which blocks the effects of other opioids.</b></li> <li>• High receptor binding affinity, long half-life, and partial antagonism may inhibit the analgesic actions of traditional opioids</li> <li>• In most cases, patients should not discontinue their treatment regimen, however it is important to consult with the patient’s addiction professional and/or MAT prescriber to determine if patient should remain on buprenorphine.</li> <li>• Potentiation of IV or inhaled anesthetics and systemic effect of local anesthetics.</li> <li>• For more information, consider review of the article <a href="#">To Stop or Not, That Is the Question: Acute Pain Management for the Patient on Chronic Buprenorphine.</a><sup>36</sup></li> </ul>
<b>Disulfiram</b>	Alcohol Use Disorder	<ul style="list-style-type: none"> <li>• Potential to cause hepatotoxicity and hypotension, therefore recommendation is to discontinue use ten days before surgery.</li> </ul>
<b>Methadone</b>	Opioid Use Disorder	<ul style="list-style-type: none"> <li>• Full <math>\mu</math>-receptor agonist and N-methyl-d-aspartate receptor antagonist</li> <li>• Continue regular prescribed methadone dose or divide dose to be administered three times daily.</li> <li>• Short-acting opioids may be used</li> <li>• Decreased minimal alveolar concentration (MAC) of inhaled agents</li> <li>• Increased risk of Torsades de pointes</li> <li>• Additive effect of methadone may cause increased sensitivity to other IV agents.</li> </ul>
<b>Naltrexone</b>	Alcohol Use Disorder and Opioid Use Disorder	<ul style="list-style-type: none"> <li>• Discontinue oral naltrexone at least 72 hours before elective surgery if opioid use is anticipated.</li> <li>• Discontinue extended-release naltrexone at least 30 days prior to surgery and switch to oral naltrexone.</li> </ul>

Treatment	Uses	Anesthesia Considerations
		<ul style="list-style-type: none"> <li>• Patients should be off opioids at least 3-7 days before resuming therapy.</li> <li>• Emergent (e.g., trauma) procedures optimize non-opioid methods.</li> </ul>

**Discharge Considerations and Relapse Prevention**

Individual postoperative discomfort can be due to a number of factors such as genetics, age, gender, type and duration of procedure, and analgesia technique.<sup>57</sup> Providing continuous and preemptive pain relief reduces the patient’s fears of unmanaged pain and possible relapse.<sup>27</sup> Whenever possible, develop the plan for post-discharge pain management prior to admission or preoperatively to include the considerations discussed below.<sup>27,63</sup>

- Review discharge instructions verbally to address any questions the patient or family might have. Also, provide printed instructions with contact information for specific concerns.
- Provide clear medication dosing instructions, education and medication monitoring plan. Encourage use of non-pharmacologic pain and stress relief (e.g., massage, physical therapy, yoga).<sup>63</sup>
- If opioids are prescribed:
  - Identify one prescriber and one pharmacy for all pain medications.
  - Assess the ability of the patient to comply with the medication plan. Discuss concerns with the pharmacist to create a dosing schedule that best fits the patient’s needs and lifestyle.
  - Prescribe for a limited time frame (two-four weeks), and divide opioids into one or two-day allotments.<sup>27</sup> State regulations outlining opioid prescribing practices may vary.
  - Inform the addiction treatment maintenance program or MAT prescribing professional of any medications, such as opioids and benzodiazepines, given to the patient during hospitalization prior to routine urine drug screening.<sup>62</sup>
  - Include and educate a family member, friend, caregiver, or sponsor when the patient is prescribed controlled substances in order to provide oversight of the frequency and amount taken.
  - Prescribe and educate a family member, friend, caregiver, or sponsor to administer rescue naloxone. Provide instructions to access 911 emergency care and transportation.
- Encourage the patient to continue participation in their recovery programs or provide resources (e.g., support groups, treatment centers) for patients who are not currently enrolled in a recovery program.
- Instruct the patient and caregiver how to [dispose of unused medication](#) and not to save unused medication for later use.
- Document in the healthcare record discharge information, including treatment course, medications administered, and medications prescribed.<sup>61</sup>

## **Conclusion**

Anesthesia professionals are responsible to provide best and safe care for all patients, including those with active substance use disorder or in recovery. Collaboration with the patient and the interdisciplinary healthcare team, thoughtful opioid-sparing multimodal approaches to address pain, and responsible oversight that includes safe prescribing practices for return home optimizes patient safety, and initial or sustained recovery from substance use disorder. As the science and practice of opioid-sparing or opioid-free multimodal analgesia continues to be integrated into practice, anesthesia professionals must maintain familiarity with the literature, practice guidelines, and federal, state and local statutes and regulations. Nurse anesthetists have the unique opportunity to respectfully partner with the patient to help maintain sobriety or enter into treatment for lifelong recovery from substance use disorder.

**Appendix A. Physiologic Implications and Analgesia and Anesthesia Considerations for Substance Use Disorder Patients**<sup>2,14,25,26,28,30,31,42,45</sup>

Substance	Physiological Implications	Considerations
<b>Alcohol</b>	<ul style="list-style-type: none"> <li>• Electrolyte abnormalities</li> <li>• Hypoalbuminemia</li> <li>• Hypoglycemia</li> <li>• Hypovolemia due to diuretic effect</li> <li>• Increased gastric acidity and volume</li> <li>• Pulmonary aspiration</li> <li>• Hemodynamic instability</li> <li>• Increased risk of bleeding</li> <li>• Wernicke-Korsakoff syndrome</li> </ul>	<ul style="list-style-type: none"> <li>• Assess need for electrocardiogram, echocardiography, chest x-ray, complete blood count, liver enzyme, liver function and electrolyte panels.</li> <li>• Consider regional analgesia and anesthesia, and medications/agents with minimal or non-hepatic metabolism.</li> <li>• Administer medications to prevent aspiration.</li> <li>• Administer thiamine to prevent Wernicke-Korsakoff syndrome.</li> <li>• Appropriately treat symptoms of withdrawal such as agitation and hallucinations on an individual basis.</li> <li>• Hemodynamic instability may be exposed by intravenous or inhalational agents in patients with preexisting cardiomyopathy, heart failure, dehydration.</li> </ul>
<b>Cocaine</b>	<ul style="list-style-type: none"> <li>• Infection or perforation of nasal septum</li> <li>• Pulmonary edema</li> <li>• Blood vessel constriction</li> <li>• Cardiomegaly, ischemia</li> <li>• Tachycardia, arrhythmia</li> <li>• Thrombocytopenia</li> <li>• Bronchospasm</li> <li>• Hyperthermia</li> <li>• Hypertension</li> <li>• Pneumothorax</li> <li>• Agitation</li> </ul>	<ul style="list-style-type: none"> <li>• Administer medications to control blood pressure.</li> <li>• Take precautions with nasogastric and orogastric tubes.</li> <li>• If possible avoid drugs such as ketamine, atropine, halothane, enflurane and older inhalational agents which can sensitize myocardium to effects of catecholamines.<sup>64</sup></li> <li>• Cocaine-free interval of at least one week prior to elective surgery is recommended.</li> <li>• Increased incidence of renal failure may impact anesthetic elimination.</li> <li>• Avoid beta-blockers due to possibility of unopposed alpha-receptor activity.<sup>64</sup></li> </ul>
<b>Hallucinogens</b>	<ul style="list-style-type: none"> <li>• Tachycardia</li> <li>• Hypertension</li> <li>• Increased body temperature</li> <li>• Edema</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor fluids and electrolytes, especially for ecstasy users.</li> <li>• Avoid anesthesia until acute effects of drug settle, if possible</li> </ul>

Substance	Physiological Implications	Considerations
	<ul style="list-style-type: none"> <li>• Decreased metabolism through liver and renal systems</li> </ul>	<ul style="list-style-type: none"> <li>• Use caution if using opioids, muscle relaxants, sympathomimetics, and ketamine.</li> </ul>
<b>Marijuana</b>	<ul style="list-style-type: none"> <li>• Airway irritability</li> <li>• Acute airway edema and obstruction</li> <li>• Myocardial depression</li> <li>• Exacerbation of existing tachycardia</li> <li>• Reversible ST segment and T wave abnormalities</li> <li>• Supraventricular or ventricular ectopic activity</li> <li>• Potentiation of nondepolarizing muscle relaxants, norepinephrine</li> <li>• Augmentation of drugs that cause respiratory or cardiac depression</li> <li>• Profound response to inhaled anesthetics</li> <li>• Sensitization of the myocardium due to increased level of epinephrine</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain airway due to potential for airway obstruction.</li> <li>• Consider administration of dexamethasone to minimize airway edema.</li> <li>• Increased Propofol dose may be required for induction.</li> <li>• Avoid drugs known to affect heart rate (e.g., ketamine, atropine, epinephrine).</li> </ul>
<b>Methamphetamines</b>	<ul style="list-style-type: none"> <li>• Hemodynamic instability, refractory hypotension</li> <li>• Decreased catecholamine</li> <li>• Cardiac arrest (during anesthesia)</li> <li>• Poor dentition</li> <li>• Acute intoxication: decreased MAC</li> <li>• Chronic use: increased MAC</li> </ul>	<ul style="list-style-type: none"> <li>• Halothane should be avoided.</li> <li>• Take precautions to avoid refractory hypotension.               <ul style="list-style-type: none"> <li>◦ Administer vasopressor (e.g., phenylephrine, epinephrine) in the treatment of hypotension.</li> </ul> </li> </ul>
<b>Opioids</b>	<ul style="list-style-type: none"> <li>• Inadequate analgesia</li> <li>• Respiratory depression</li> <li>• Respiratory Depression</li> <li>• Withdrawal</li> <li>• Cross-tolerance</li> <li>• Hypotension</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult central and peripheral venous access.</li> <li>• Consider alternative pain management strategies that do not involve the administration of opioids.</li> </ul> <p><b>Address Opioid Overdose</b></p> <ul style="list-style-type: none"> <li>• Assess ventilation and provide 100% oxygen.</li> <li>• Administer naloxone, as appropriate.</li> </ul>

Substance	Physiological Implications	Considerations
	<ul style="list-style-type: none"> <li>• Difficult central and peripheral venous access</li> <li>• Coagulopathy and hemodynamic instability</li> <li>• Liver disease and malnutrition</li> <li>• Reduced intravascular fluid volume</li> </ul>	<ul style="list-style-type: none"> <li>○ Observe patient to ensure they do experience delayed respiratory depression after administration of naloxone.</li> <li>• Consider endotracheal intubation and mechanical ventilation if naloxone does not successfully reverse respiratory depression.</li> </ul>
<b>Solvents</b>	<ul style="list-style-type: none"> <li>• Pulmonary hypertension</li> <li>• Tachycardia and arrhythmia</li> <li>• Panic attack risk</li> <li>• Hypermetabolic state</li> <li>• Hematuria</li> <li>• Cerebral/cerebellar atrophy</li> <li>• Airway resistance</li> <li>• Increased bronchial irritation</li> <li>• Methemoglobinemia</li> <li>• Reduced diffusing capacity</li> </ul>	<ul style="list-style-type: none"> <li>• General anesthesia is preferred in cases of acute intoxication, especially if patient is combative or has an altered perception.</li> </ul>

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