



Dexmedetomidine as an Analgesia Alternative

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Abstract

Opioid abuse and misuse within the medical field is a national problem that is only continuing to trend upward. Unfortunately, many of these addictions can be tracked back to routine surgeries, in which opioid over-prescription is often seen. Studies involving Enhanced Recovery After Surgery (ERAS) have shown that decreasing opioid administration intraoperatively and post-operatively not only improves the length of stay within the hospital, but also improves complications and pain scores for patients undergoing specific surgeries, such a laparoscopic cholecystectomies (3). Non-opioid medications present not only good alternatives, but often, have even more favorable side effect profiles that can be utilized to help combat the use of intraoperative and postoperative opioid consumption.

Introduction

Within anesthesia, the use of opioids to effectively treat pain both intraoperatively and postoperatively is common practice. Prescription opioids are now the most common cause of overdose deaths, indicating to healthcare providers that there is an iatrogenic cause that is fueling the opioid epidemic. Reducing the development of opioid addiction and formulating anesthesia plans that contain opioid alternatives can not only improve perioperative outcomes, but also enhance patient recovery by eliminating many of the negative effects of opioids including, impaired gastrointestinal function, myocardial & respiratory depression, and PONV (4). This problem also exemplifies the need for opioid alternatives, such as Dexmedetomidine.

Effective pain management and the need for opioid alternatives is a topic of great interest in anesthesia due to the side effects associated with their use and their ability to greatly impair postoperative recovery. The American Society of Anesthesiologists supports the use of ERAS protocol, which stands for enhanced recovery after surgery. These guidelines include information regarding care preoperatively, intraoperatively, and postoperatively, and have clearly demonstrated improved patient outcomes (6). “Opioid free” or “opioid-sparing” anesthesia employs new pharmacological therapies, such as **Dexmedetomidine**, that offer effective pain management. This way of practice reduces the opioid-related adverse events associated with such use, including hypoxemia, cognitive dysfunction, and post-operative ileus (1).

There has been a recent paradigm shift to using “opioid free” or “opioid-sparing” anesthesia, which employs new pharmacological therapies, such as Dexmedetomidine, that offer effective pain management. Currently, Dexmedetomidine is used as an effective medication for sedation and sympatholysis due to its highly selective agonism at the alpha-2 adrenoreceptor.

Review of Literature

The 2016 American Society of Anesthesiologists (ASA) guidelines support the use of ERAS protocol and promotes the use of multimodal and opioid-sparing techniques. Within these guidelines, Dexmedetomidine (Precedex), a potent and selective alpha-2 agonist, is speculated to be an attractive option for reducing opioid consumption during anesthesia. As an alpha-2 agonist, Dexmedetomidine possesses a different mechanism of action relative to opioids (6). The most significant side effect associated with opioid consumption is respiratory depression, which is especially apparent in patients that have COPD and obesity. Other side effects include impaired gastrointestinal motility and bowel distention. To an anesthesia provider, this can greatly impair ventilation as the distended bowel can push the diaphragm upward, leading to both an increased work of breathing and hypoxemia (4). Furthermore, the adverse side effects associated with opioid use can lead to delayed discharge from the hospital, which is why alternatives such as Dexmedetomidine need to be further investigated (1).

The usual regimen for post-operative pain control after a laparoscopic cholecystectomy includes a multimodal plan involving local anesthetic, NSAIDs, Dexamethasone, and a post-operative opioid. However, new research has aimed to look at its benefit when added to a multi-modal analgesic regimen. Research has shown that when Dexmedetomidine was given at 1 mcg/kg preoperatively, patients pain was significantly reduced during the first hour post-operatively but neglected to show any significant difference in the time after that (6).

The benefits of Dexmedetomidine are not limited to its analgesic effects. Studies have also investigated its involvement for the reduction of post-operative nausea vomiting, which is one of the most common adverse effects associated with opioid consumption (1). Studies have showed that when two groups are compared, one receiving opioid-free total intravenous anesthesia (TIVA) with Dexmedetomidine and Propofol and one receiving opioid-containing total intravenous anesthesia with Remifentanyl and Propofol, they were able to conclude that the group that received the opioid free infusion including Dexmedetomidine had lower Fentanyl requirements during only the first two hours post-operatively. Furthermore, this study also showed that this infusion significantly lowered the need for post-operative nausea medication, such as Ondansetron (1).

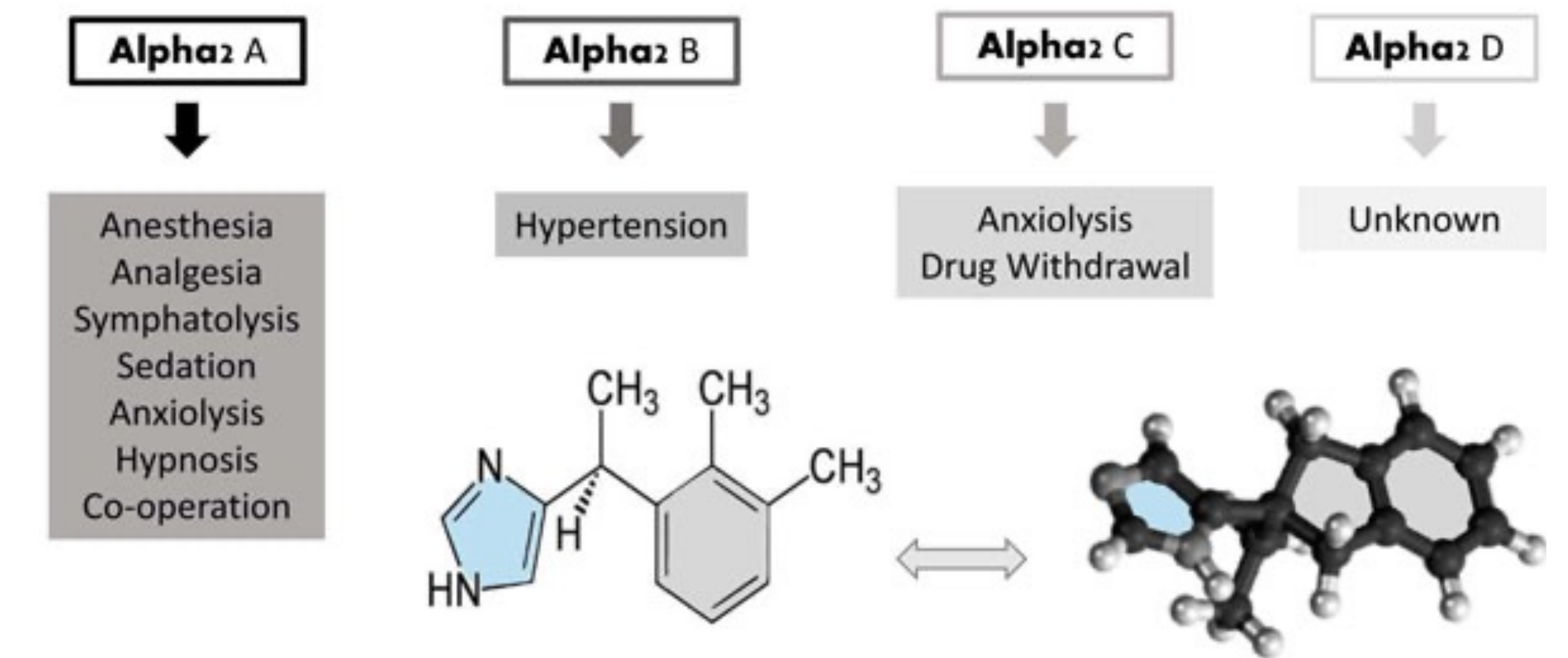


Figure 1. Dexmedetomidine Action on Alpha-2 Receptors

Conclusions

“Opioid-free anesthesia” is an attractive option for anesthesia providers looking to minimize opioid related side effects within their practice. Dexmedetomidine has been proven to offer analgesic benefits during the early post-operative period. The benefits of adding Dexmedetomidine to a multi-modal anesthesia plan do not end with just decreased opioid requirements. Research has shown that Dexmedetomidine offers other benefits including PONV reduction.

While the CDC has published guidelines regarding chronic pain management, there is no such guideline on post-operative pain management. Therefore, there is a wide range of variability in post-operative opioid prescriptions as well as tendency to overprescribe and distribute a high number of pills. Therefore, anesthesia providers need to be aware of the issues surrounding the use of opioids both intraoperatively and post-operatively, and carefully consider all options available.

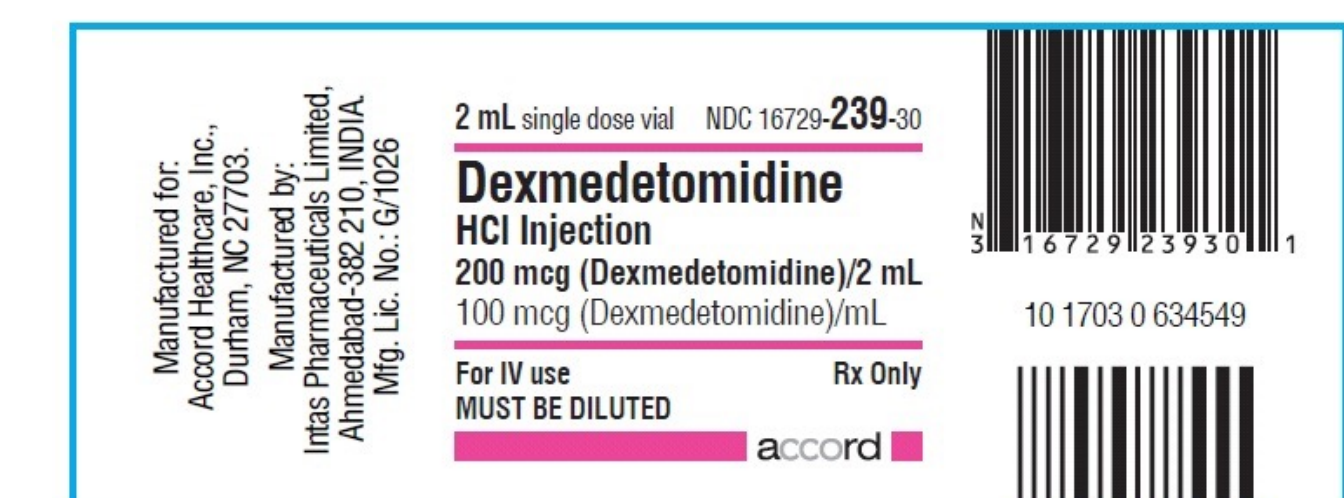


Figure 2. Dexmedetomidine HCL Injection Packaging

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Images:

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