

Is there a Role for IV Dexamethasone in Perioperative Pain Management?

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More than twelve years after the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) declared freedom from pain as a quasi human right, treatment of post-operative pain is still a major challenge for providers caring for surgical patients [1]. Patients' hospital experiences are strongly influenced by their perception of pain management and their provider's competency to ease pain [2]. In spite of numerous publications "demonizing" the adverse effects of opioids, opioids deservedly remain the major pain treatment modality in our daily anesthesia practice [3]. We must admit that a true alternative to opioids is not yet found. A multimodal approach to the treatment of pain is the current and preferred concept of acute and chronic pain management. By combining opioids with other non-opioid adjuncts, such as gabapentin, pregabalin, ketamine, clonidine, etc., providers seek to reduce the opioid dose by utilizing the additive or synergistic effect of non-opioid substances [4,5]. Following the trend in the literature, a single, IV dose of dexamethasone can be added to the list of adjuncts for pain treatment.

Dexamethasone is a potent steroid with a safe record of side effects [6]. It is best known intraoperatively as an anti-inflammatory agent that reduces tissue edema due to surgical trauma, and as a proven antiemetic.

Dexamethasone's antiemetic property is well-established. The mechanism of action is probably due to reduction of circulating inflammatory mediators that can stimulate the chemoreceptor trigger zone in brain. In addition, the antagonistic effect of dexamethasone on 5-HT receptors may explain its antiemetic capability [7,8]. Yet, the exact antiemetic mechanism of action remains elusive.

A single dose of dexamethasone has been shown to shorten recovery time from surgical procedures and reduce post-operative pain scores [9,10]. These lower scores can be explained by the fact that dexamethasone suppresses prostaglandin production and reduces post-operative tissue edema [11]. Exactly how dexamethasone reduces post-operative pain is based on assumptions that have not been thoroughly elaborated. Nevertheless, a recent meta-analysis underscored the effectiveness of single-dose dexamethasone for post-operative pain control as an adjunct to other pain medications [12].

There is an ongoing debate about the degree to which steroids, including dexamethasone, have adverse effects on patients undergoing major surgeries. One concerning effect is increased risk of surgical wound infection because steroids directly suppress the immune response and elevate a patient's glucose level. Other rare but possible adverse effects are gastric ulceration and suppression of adrenal gland activity.

However, dosage and time of administration can mitigate some adverse effects. A single-dose of dexamethasone causes no or mild adverse effects, whereas chronic usage may create major problems. In the case of single-dose IV dexamethasone for post-operative pain control and post-operative nausea/vomiting (PONV), the side-effect profile is benign, as shown in multiple studies and meta-analysis [6,12,13]. For both indications, 8 mg of dexamethasone is superior to 4 mg, although the minimum effective dose has not yet been established.

Also the time of administration matters. Dexamethasone was found to reduce post-operative pain more effectively when given at least an hour prior to surgery or prior to anesthesia induction [14].

In summary, 8 mg of dexamethasone, given shortly prior to surgery is a safe, effective, and inexpensive choice to reduce post-operative pain and (PONV) in lieu of the available data. In patients with uncontrolled diabetes, adrenal gland disorders and other endocrinopathies, dexamethasone should be used judiciously.

Further studies are necessary to establish the minimum effective dose of dexamethasone and the best timing for its application in perioperative setting.

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