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Original Research Article

A Prospective Study on Dexamethasone as an Analgesic Adjunct for Postcesarean Delivery Pain

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Abstract: Dexamethasone is a glucocorticoid medication used to treat rheumatic problems, a number of skin diseases, severe allergies, asthma, chronic obstructive lung disease, croup, brain swelling, eye pain following eye surgery, superior vena cava syndrome (a complication of some forms of cancer), and along with antibiotics in tuberculosis. The major finding in this study was that for women who underwent cesarean delivery under spinal anesthesia that included intrathecal morphine, a single dose of dexamethasone 8 mg IV administered prior to skin incision did not reduce postoperative analgesic consumption or pain scores. Fifty women were enrolled and randomized to two groups of 25 patients. The median (IQR) opioid consumption in the first 24 hours after cesarean delivery was 12.5 mg (5-20 mg) in the dexamethasone group compared to 13.5 mg (5-22 mg) in the placebo group. The median difference in opioid consumption at 24 hours (94% CI) was -3 mg (-12.2 to 5.7) and was not significantly different between groups.

Keywords: Dexamethasone, Analgesic, Postcesarean Delivery Pain.

INTRODUCTION

Dexamethasone is a glucocorticoid medication used to treat rheumatic problems, a number of skin diseases, severe allergies, asthma, chronic obstructive lung disease, croup, brain swelling, eye pain following eye surgery, superior vena cava syndrome (a complication of some forms of cancer), and along with antibiotics in tuberculosis. In adrenocortical insufficiency, it may be used in combination with a mineralocorticoid medication such as fludrocortisone. In preterm labour, it may be used to improve outcomes in the baby. It may be given as an injection into a muscle, as an injection into a vein, as a topical cream or ointment for the skin or as a topical ophthalmic solution to the eye. The effects of dexamethasone are frequently seen within a day and last for about three days.

Acute postoperative pain is an undesirable outcome that can delay functional recovery for patients undergoing surgical procedures. Multimodal analgesic approaches have been used as an important strategy to mitigate postoperative pain. Dexamethasone, a commonly administered glucocorticoid with anti-inflammatory properties, has been used to reduce edema and tissue damage in a variety of conditions. Studies have shown that perioperative dexamethasone, which has time to the peak effect of 45 min to 1 h, may also have analgesic efficacy in general surgical patients, particularly when administered preoperatively. However, only a few studies have investigated the analgesic efficacy of intravenous dexamethasone in women undergoing cesarean delivery under spinal anesthesia who received intrathecal morphine with both mixed and inconclusive results. These inconsistent findings could be partly explained by the fact that in some of these studies, analgesic efficacy was not the primary outcome, analgesic outcomes were not adequately reported, and the timing of dexamethasone administration was variable, being administered preoperatively, before skin incision, postdelivery or postoperatively. Interestingly in the 2 randomized controlled trials where dexamethasone reduced postoperative pain score, it was either administered preoperatively or following spinal anesthesia but before skin incision. These findings suggest that the analgesic effect of dexamethasone may be related to the timing of its administration, similar to its antiemetic effect [1-3].

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OBJECTIVE

1. To study dexamethasone as an analgesic adjunct for postcesarean delivery pain

METHODOLOGY

50 full-term pregnant patients were studied. Patients were randomly allocated into two groups determined by a computerised table. Exclusion criteria were contraindication to regional anaesthesia, allergy to dexamethasone, opioids or local anaesthetics, hypertension or diabetes originated during pregnancy.

RESULTS

The major finding in this study was that for women who underwent cesarean delivery under spinal anesthesia that included intrathecal morphine, a single dose of dexamethasone 8 mg IV administered prior to skin incision did not reduce postoperative analgesic consumption or pain scores. Fifty women were enrolled and randomized to two groups of 25 patients. The median (IQR) opioid consumption in the first 24 hours after cesarean delivery was 12.5 mg (5-20 mg) in the dexamethasone group compared to 13.5 mg (5-22 mg) in the placebo group. The median difference in opioid consumption at 24 hours (94% CI) was -3 mg (-12.2 to 5.7) and was not significantly different between groups.

Table 1: Postoperative analgesic outcomes

Time	Dexamethasone ($n = 25$)	Placebo ($n = 25$)	*P* value
Total opioid consumption in morphine equivalents (mg)			
24 h	14 (6, 20)	12.6 (3.5, 30)	0.71
48 h	20 (10.0, 40.0)	22.5 (3.75, 48.7)	0.709
Pain score at rest			
2 h	2 (0.0, 4.0)	3.5 (1.5, 5.0)	0.190
24 h	2 (0.0, 3.0)	2.5 (1.0, 4.2)	0.267
48 h	2 (0.0, 3.0)	2 (0.0, 4.0)	0.491
Pain score with movement			
2 h	5 (2.0, 7.0)	5 (4.0, 7.0)	0.273
24 h	5 (3.0, 7.0)	5 (4.0, 6.8)	0.465
48 h	4 (3.0, 6.0)	5 (3.0, 7.0)	0.525

DISCUSSION

While two large meta-analyses demonstrated that a single dose of IV dexamethasone in the general surgical patients may have analgesic benefit, the absolute reduction in opioid consumption, pain scores, and time to first analgesic request were small and maybe of dubious clinical benefit. In one meta-analysis which included 45 randomized controlled trials, dexamethasone reduced the mean 2 h and 24 h opioid consumption by only 0.87 mg morphine equivalents (95% CI: −1.40, −0.33) and 2.33 mg morphine equivalents (95% CI: −4.39, −0.26), respectively, when compared with placebo. Dexamethasone administration only increased the mean time to first analgesic request by 12.06 min (95% CI: 0.80, 23.32) when compared with placebo. Dexamethasone administration was also only associated with a reduction in mean 2 h and 24 h pain scores of 0.49 (95% CI: −0.83, −0.15) and 0.48 (95% CI: −0.62, −0.35), respectively, when compared with placebo using an 11-point scale. A second metanalysis of 24 randomized controlled trials similarly reported only small differences in pain scores at rest and on movement (at ≤4 h and 24 h) and opioid consumption between the dexamethasone and the placebo groups in the general surgical patient population. One meta-analysis determined that doses of dexamethasone greater than 0.1 mg/kg reduced postoperative pain and opioid consumption [4, 5].

In the postcesarean delivery patient population, the profound analgesic effect of neuraxial morphine may lead to a smaller dynamic range in postoperative opioid consumption when compared with the general surgical population. As a result, in a multimodal postcesarean analgesic regimen, which includes intrathecal morphine, acetaminophen, and nonsteroidal anti-inflammatory drugs, the addition of dexamethasone may have a negligible additional analgesic benefit despite the preincisional and preemptive administration as demonstrated in the recent study by Selzer *et al*., [6].

Similarly, in patients that received neuraxial morphine, including for postcesarean delivery analgesia, the administration of dexamethasone resulted in a very small reduction in pain scores at 24 h and in patients having cesarean delivery, it did not reduce the need for rescue analgesia [7].

Postoperative pain arises from a complex network of pathways, but a key mechanism of acute postsurgical pain arises from direct tissue disruption and subsequent regional inflammation. The pain stimulus is thought to be caused by local tissue ischemia and edema, triggered by the release of chemomodulators such as interleukin and tumor necrosis factor and hyperalgesia from sensitization of existing pain fibers. Dexamethasone is a glucocorticoid with anti-inflammatory properties and multiple clinical applications. The mechanism for the analgesic

properties of dexamethasone is not precisely understood but is attributed to the downregulation of prostaglandin synthesis, reduction of proinflammatory chemokines, and the altered transmission of nociception at the level of nerve tissue [8, 9].

CONCLUSION

The major finding in this study was that for women who underwent cesarean delivery under spinal anesthesia that included intrathecal morphine, a single dose of dexamethasone 8 mg IV administered prior to skin incision did not reduce postoperative analgesic consumption or pain scores.

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