Original Article

Comparative Study of the Effect of Intravenous Dexamethasone and Hydrocortisone on the Incidence of Headache after Spinal anesthesia in Patients after Cesarean Section

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Abstract

Background: Headache after spinal anesthesia for cesarean section is a common and unpleasant problem. Post-dural puncture headache develops in 16%–86% of the cases after attempted epidural block with large bore needles. The present study aimed to compare the effect of intravenous dexamethasone and hydrocortisone in reducing the incidence of headache after spinal anesthesia in cesarean section. Methods: This study was a clinical trial on 216 women undergoing cesarean section in ASA class I and II. There were 72 patients in each group after the patients were divided into three groups. The first group received dexamethasone 8 mg, the second group received 200 mg hydrocortisone and the third group was given normal saline 2 ccs (as placebo). Immediately, 6, 24, 48 hours, and one week after spinal anesthesia, the severity of headache was assessed (based on a visual pain scale of 1 to 10 was classified). Results: The prevalence of headache was 41.6% (30 of 72 patients) in the placebo group, 22.2% (16 of 72 patients) in the dexamethasone group and 13.8% (10 of 72 patients) in hydrocortisone group. The difference between dexamethasone and hydrocortisone in reducing headache prevalence was not statistically significant (p=0/21). Conclusion: Dexamethasone and hydrocortisone are effective for decreasing the incidence of headache intensity. There was no significant difference in the incidence and severity of headache between two groups. These medications can not cause delayed onset of headache.

Keywords: Dexamethasone, hydrocortisone, spinal anesthesia, Headache, cesarean section

Introduction

A direct result of dural puncture, which results from a decrease in the volume cerebrospinal fluid (CSF), is Post-dural puncture headache (PDPH). Reduced CSF causes a downward transition of the brain, which ultimately imposes a tension on sensitive supporting structures [1]. The prevalence of PDPH varies based on many factors such as age, sex, pregnancy, and needle shape and size [2]. Young people and women, in particular pregnant women, are at risk of PDPH which is highly prevalent in the recent group [3]

PDPH usually occurs 12 to 48 hours after dural puncture but may also be present immediately or even months later. Post spinal headache is usually a severe, debilitating, non-pulsated headache originating from the posterior occipital region and exaggerating in standing position. Post spinal headache can present with or without nausea, vomiting, anorexia, and visual and aural problems. The PDPH headache is a self-limiting process recovering in 75% and 88% of cases, even without treatment, within 1 and 6 weeks respectively [4].

The risk of PDPH is directly related to the diameter of the needle used to puncture the dura. Although using a smaller needle reduces the risk of PDPH, the cost-benefit balance between the risk of PDPH and technical challenges must be considered. This balance is usually met using a 24- or 25-gauge needle [1]. The technique, needle insertion site, and needle shape, type, and size also directly affect the risk of PDPH [5].

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Conventional treatments for PDPH include bed rest (CBR), hydration, analgesics (acetaminophen, non-steroidal anti-inflammatory drugs, and opiates), intravenous caffeine, sumatriptan, aminophylline, and adrenocorticotropic hormone (ACTH). Nevertheless, none of these therapies can completely resolve the headache, they only make it tolerable for patients. In pregnant women with severe headaches limiting maternal activity or involving the cranial nerve, an epidural blood patch may be used as the bottom-line treatment [6].

Given the above-mentioned issues and the beneficial pain-reducing effects of corticosteroids [6], here, we aimed to determine the effects of intravenous hydrocortisone and dexamethasone in reducing the incidence of PDPH in women undergoing cesarean section.

Materials and Methods

This double-blind clinical trial was performed on 216 women aged 18-40 years old categorized as American Society of Anesthesiologists (ASA) class I and II. The study was conducted in Mahdieh Hospital of Tehran, Iran. All the women underwent spinal anesthesia by an experienced anesthesiologist. The histories of coagulopathy, eclampsia, preeclampsia, seizures, and using special drugs were considered as exclusion criteria. Before entering the study, informed consent was obtained.

Spinal anesthesia was performed in a sitting position and straight forward midline direction using a 25-gage spinal needle. Using a random number table, the patients were randomly divided into three groups as dexamethasone (8 mg), hydrocortisone (200 mg), and normal saline (2 ml). The pain severity was recorded immediately, 6, 24, and 48 hours, and 1 week after cesarean section following spinal anesthesia. The pain severity was determined using the visual analog scale (VAS) assigning pain scores from 1 to 10. The data was analyzed by SPSS software.

Results

In this study, 72 patients were enrolled in each group (i.e. control, dexamethasone, and hydrocortisone). The participants' mean ages were 26.64±5.32, 27.72±5.73, and 26.28±5.82 years in the control, hydrocortisone, and dexamethasone groups respectively. No significant difference was observed in the mean age after comparing the three groups (P = 0.28).

Immediately after a cesarean section, the headache was only observed in one patient in the control group. There was no case of headache in none of the groups at 1 week after the cesarean section. Frequencies of headaches were 1.4%,9.7%, 25%, 33.3%, and 38.9% immediately, 6, 24, 48 hours and 1 week after spinal anesthesia in the control, 0%, 1.4%, 11.1%, 13.9%, and 13.9% in the hydrocortisone, and 0%, 4.2%, 11.1%, 20.8%, and 20.8% in the dexamethasone groups, respectively. The frequencies of headaches were significantly different among the three control groups at 24 (P=0.03) and 48 hours (P=0.01), as well as 1 week (P=0.002) after cesarean section. Accordingly, the frequency of headache following cesarean section was significantly higher in the control group compared with either hydrocortisone group at 6 (P=0.02), 24 (P=0.03), 48 (P=0.006) hours and 1 week (P=0.001) or dexamethasone group at 24 (P=0.01), 48 (P=0.09) hours and 1 week (P=0.03) after spinal anesthesia. The frequencies of headaches were also higher in dexamethasone compared with the hydrocortisone group at 6 and 48 hours and 1 week after cesarean section; however, the differences were not statistically significant.

In the control group, 1 (3.33%), 6 (20%), 11 (36.67%), 12 (40%) of headaches developed immediately, 6, 24, and 48 hours after cesarean section respectively. On the other hand, 1 (10%), 5 (50%), and 4 (40%) of headache cases in the hydrocortisone group, and 3 (18.75%), 5 (31.25%), and 8 (50%) of headaches in the dexamethasone group initiated at 6, 24, and 48 hours after cesarean section respectively. There were no statistically significant differences among the three groups regarding the incidence of the headache immediately, 6, 24, and 48 hours following cesarean section.

Regarding the pain severity, the headaches were significantly more severe in the control group compared with the hydrocortisone and dexamethasone groups at 24 (P = 0.02), and 48 (P = 0.01) hours and 1 week (P = 0.001) after cesarean section. Comparing the headache severity, patients received hydrocortisone experienced significantly milder pain at 6 (P = 0.02), 24 (P = 0.03), and 48 (P= 0.004) hours and 1 week (P = 0.001) after cesarean section. Also, after cesarean section, the patients in the dexamethasone group had significantly lower pain at 24 hours (P=0.03) and 1 week (P=0.01) in comparison with the control group. Finally, there were no significant differences in the severity of headaches comparing dexamethasone and hydrocortisone groups at 6 (P=0.31), 24 (P=0.99), and 48 hours (P=0.27) and 1 week (P=0.28) after cesarean section.

Discussion

In this study, the prophylactic effects of dexamethasone and hydrocortisone were investigated on the incidence of headaches after the cesarean section in women undergoing spinal anesthesia. The results of this study showed that the frequency of headache was significantly higher in the control than hydrocortisone and dexamethasone groups at 6, 24, and 48 hours and 1 week after cesarean section. In a study conducted by Manouchehrian *et al*., the frequency of headache was significantly lower in patients who received dexamethasone compared with the control group [7]. Also, in a study by Sameh *et al*, administrating prophylactic ACTH during spinal anesthesia reduced the incidence of headaches [8]. In the study of Ashraf *et al*., hydrocortisone administration lowered the frequency of pain at 6, 24, and 48 hours after treatment [6]. Overall, the results of the above-mentioned studies were similar to those of our study.

According to our study, the time of headache onset did not significantly differ comparing the control group with neither hydrocortisone nor dexamethasone group. This indicated that using these drugs did not delay the onset of headaches which was in line with the report of Manouchehrian *et al*. [7] who also reported that dexamethasone treatment did not delay headaches following spinal anesthesia. In contrast, Sameh *et al.* stated that prophylactic ACTH delayed the onset of headaches which may be due to the different nature of the drugs [8].

According to our findings, the severity of headache was significantly higher in the control compared with the hydrocortisone group at 6, 24, and 48 hours and 1 week after cesarean section. Comparing the headache severity between the dexamethasone and control groups, patients in the recent group experienced significantly milder pain at 24 hours 1 one week after the cesarean section. Similar to this, Ashraf *et al*. noted milder headaches in patients received hydrocortisone compared with the control group at 6, 24, and 48 hours after the drug administration. In the present study, there were no significant differences between the dexamethasone and hydrocortisone groups regarding headache frequency, onset, and severity at 6, 24, and 48 hours and 1 week after cesarean section. To our knowledge, this was the first report comparing the prophylactic effects of these two drugs after the cesarean section.

Conclusion

Hydrocortisone and dexamethasone were equally effective in reducing the incidence and severity of headache following cesarean section. Nevertheless, these drugs did not delay the onset of a headache.

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