

## ORIGINAL ARTICLE

## Dexamethasone in Preventing Post Dural Puncture Headache

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## ABSTRACT

**Background and Aim:** Post-dural puncture headache is major complication of spinal anesthesia that occurs in 40% of cases. Invasive treatment like an epidural blood patch might be required for post-dural puncture headache. The Dexamethasone effect on Post-Dural Puncture Headache following spinal anesthesia is not addressed and well understood. The aim of the present study was to assess the role of Dexamethasone in post-dural puncture headaches.

**Materials and Methods:** This cross-sectional study was carried out on 456 patients who underwent spinal anesthesia from 16<sup>th</sup> April 2021 to 15<sup>th</sup> October 2021 at the department of Anesthesiology of Pakistan Ordnance Factories (POF) Hospital, Wah Cantt, Mayo Hospital, Lahore and Mohi-ud-Din Teaching Hospital, Mirpur AJK. All the patients who underwent spinal anesthesia were enrolled whereas patients with previous headache disorder and contraindicated for steroids were excluded. Patients were allocated to two groups; Group A (Placebo) and Group B (Dexamethasone). Placebo group patients were injected with normal saline (2 mL) and other group patients with dexamethasone prophylactic epidural injection (2 mL, 8 mg). The incidence and severity of post-dural puncture headache and backache at the puncture site were evaluated on the 1<sup>st</sup>, 3<sup>rd</sup>, and 7<sup>th</sup> postoperative days. SPSS version 24 was used for data descriptive analysis.

**Results:** A total of 456 patients underwent spinal anesthesia in which 228 patients over age of 20 years were assigned to each group. The prevalence of post-dural puncture headache was found lower in dexamethasone group patients 14 (6.2%) compared to normal saline 26 (11.6%) on the post-operative first day ( $p < 0.05$ ). However, on days 3 and 7, the difference disappeared. The overall prevalence of post-dural puncture headache was 21 (9.4%) in the dexamethasone group and 11 (4.7%) in the placebo group, which is statistically insignificant ( $p$ -value=0.132). There was no statistical significance in terms of headache severity (2.7% in the study group versus 7% controls group;  $p$ -value =0.128). The incidence of symptoms like vomiting or nausea occurred in a lower number of dexamethasone group patients compared to placebo. The prevalence of backache between the two groups was found insignificant.

**Conclusion:** Our study found that the prevalence of post-dural puncture headache was lower in dexamethasone group patients but improved with increasing post-operative days and extended to the placebo group. Our findings contradict the earlier studies in regard to dexamethasone's effectiveness in post-dural puncture headache treatment. Based on our findings, dexamethasone cannot be recommended for post-dural puncture headaches.

**Keywords:** Post-Dural puncture headache; Dexamethasone; Spinal Anesthesia

## INTRODUCTION

Spinal anesthesia is an ordinary procedure used in various surgeries related to Gynaecology. Spinal anesthesia is a nerve block frequently used depending on its availability. The local anesthetic insertion in subarachnoid space is generally referred to as spinal anesthesia [1]. Neurological complications, nausea, bradycardia, back pain, urinary retention, and PDP headache are the major complications of this procedure [2-4]. Among all these complications, post-dural puncture headache was firstly discovered in 1899 [5]. The positional symptom is the most noticeable post-dural puncture headache symptom that exacerbates and is relieved in standing and completely lying down position. Vague headache referred to occipital and frontal headache. Femininity, age, and headache prior history are the various risk factors for anesthesia post-spinal headache [6, 7].

Previous research by Siddiqui et al, has reported that the prevalence of post-spinal anesthesia headache was 11.7% [8]. Drug-induced Meningismus and infection are the

common post-spinal anesthesia headache like migraine. An individual being unable to perform any activities, its sternness varies from trivial to severe [9].

Drinks, small and special needles with the tip along with fibers of Dura mater rather than perpendicular are common preventive methods [10]. The International Headache Society has developed post-dural puncture headache diagnostic criteria using for differentiating PDPH from headaches like migraine, which has proven to be beneficial [11]. Treatment for PDPH varies depending on the treatment center. Despite the fact that intravenous caffeine has been shown in some studies to be ineffective, most medics yet recommend rest and intravenous caffeine [12]. Dexamethasone is a powerful steroid drug identified as an anti-inflammatory drug that weakens the immune system [12]. Several studies [13, 14] have examined the effect of hydrocortisone and Dexamethasone in the post-puncture headaches treatment. However, contradictory results have been reported. A previous study also

examined the Dexamethasone effect on PDPH in post-caesarean section pregnant women [15]. The present study focused on the efficacy and effectiveness of Dexamethasone on PDPH in general.

## MATERIAL AND METHODS

This cross-sectional study was carried out on 456 patients with an age over 20 years who underwent spinal anesthesia from 16<sup>th</sup> April 2021 to 15<sup>th</sup> October 2021 at the Department of Anesthesiology of Pakistan Ordnance Factories Hospital, WahCantt, Mayo Hospital, Lahore and Mohi-ud-Din Teaching Hospital, Mirpur AJK. All the patients who underwent spinal anesthesia were enrolled whereas patients with previous headache disorder history and contraindicated for steroids were excluded. Participants were allocated into categories; Group A (Placebo) and Group B (Dexamethasone). Placebo group patients were injected with normal saline (2 mL) and other group patients with dexamethasone prophylactic epidural injection (2 mL, 8 mg). The incidence and sternness of PDPH and backache at the puncture site were evaluated on the 1<sup>st</sup>, 3<sup>rd</sup>, and 7<sup>th</sup> postoperative days. Patients who agreed to informed consents in written form, patients with null migraine history, no underlying diseases, and convulsion were enrolled. Ethical approval was taken from the hospital ethical committee. Each group consisted of 228 patients. All participants in the current study used similar conditions for both groups by lay bed supine, and anesthetic was inoculated into the lumbar area using spinal needle No.24. The participants of control group were then inoculated with 2 mL of normal saline during surgery, while the participants of dexamethasone group were inoculated with 2 mL (8mg) of Dexamethasone as a vein's infusion. During surgery, participants were closely observed during their hospitalization. The headache severity was recorded at three different intervals 1<sup>st</sup>, 3<sup>rd</sup>, and 7<sup>th</sup> postoperative days. Severe headache, moderate headache, mild headache, and no headache were the different recorded responses. For data analysis, SPSS version 24 was used. A Chi-square test was performed to compare the two group's headache responses.

## RESULTS

A total of 456 patients underwent spinal anesthesia in which 228 patients were assigned to each group. The prevalence of post-dural puncture headache was found lower in dexamethasone group patients 14 (6.2%) compared to normal saline 26 (11.6%) on the post-operative first day ( $p < 0.05$ ). However, on days 3 and 7, the difference disappeared. The overall prevalence of post-dural puncture headache was 21 (9.4%) in the dexamethasone group and 11 (4.7%) in the placebo group, which is statistically insignificant ( $p\text{-value} = 0.132$ ). There was no statistical significance in terms of headache severity (2.7% in the study group versus 7% controls group;  $p\text{-value} = 0.128$ ). The prevalence of back ache between the two groups was found insignificant. Figure-1 demonstrate the incidence of post-dural puncture headache in patients underwent spinal anesthesia. The complication of dexamethasone injected through spinal anesthesia reduced with post-surgery days as shown in Table-1. Comparison of Dexamethasone and normal saline

based on headache and symptoms after 7<sup>th</sup> post-operative days.

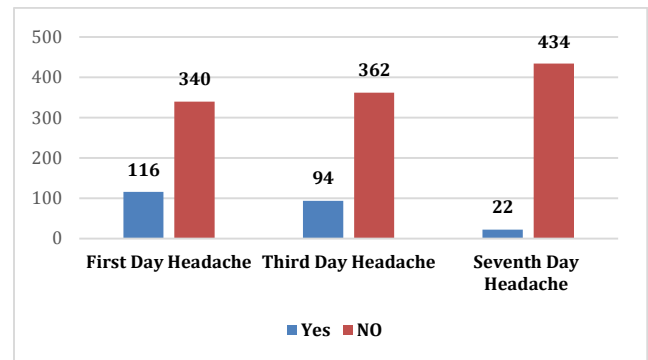


Figure 1 The incidence of post-dural puncture headache

Table 1: Dexamethasone Severity of spinal anesthesia complication and incidence among all participants (n=456)

Parameters	Headache	Frequency n	Percentage %
First Day Headache	Severe	8	1.8
	Moderate	34	7.5
	Mild	74	16.2
	No Headache	340	74.6
Third Day Headache	Severe	7	1.5
	Moderate	25	5.5
	Mild	62	13.6
	No Headache	362	79.4
Seventh Day Headache	Severe	1	0.21
	Moderate	7	1.5
	Mild	14	3.1
	No Headache	434	95.2

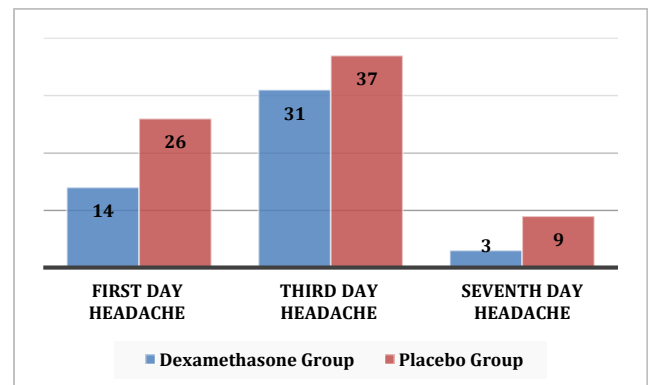


Figure 2: Comparison of Dexamethasone and normal saline based on headache and symptoms after 7<sup>th</sup> post-operative days.

## DISCUSSION

Spinal anesthesia being an effective anesthetic technique used in various surgical interventions related to Orthopedic and Gynaecology etc. [16]. Post-Dural-Puncture Headache is recognized as the spinal anesthesia major impediments with vague headaches [17]. The prevalence of PDPH has decreased significantly as a result of improved medical techniques. Previous studies on the post-spinal anesthesia headache incidence rate reported variant rates between 0.2% to 24% [18, 19]. Furthermore, another study by Zhou et al. [20] have confirmed Dexamethasone's beneficial effects on periodontal ligament stem cells. Post-dural

puncture headache incidence rate was reported 6.8% in the present study where patients who underwent no prior intervention, given the previous studies findings, prevalence is average. The typical age of PDPH experiencing participants in the current study was substantially lower compared to those who had null postsurgical headache experience. The previous research by Yousefian et al., found that PDPH is common in adults, particularly those between the ages of 18 and 30 [21].

According to previous studies, female's particularly pregnant women, were more susceptible to PDPH [22]. The occurrence of PDPH was stated to be 7.34% in a study of 119 spinal anesthesia patients carried by Bardon et al., [23]. The current study results concluded that for spinal anesthesia, PDPH is lenient complexity and the patient's recovery has no significant association with Dexamethasone usage which resembled other earlier investigations findings [24-27]. Nevertheless, no significant difference in headache intensity was observed between the two groups on 3<sup>rd</sup> and 7<sup>th</sup> days. The frequency of participant reporting headaches in the Dexamethasone group on 3<sup>rd</sup> day increased and eventually equated the frequency of headache among patients receiving placebo. The headache subsided significantly by the seventh day; frequency of patients in both groups with headache.

Kumar et al. [28] found no statistically significant difference in PDPH incidence amongst the Dexamethasone and placebo group in their study. However, the headache severity reported to reduce by administering intravenous prophylactic Dexamethasone was reported. Anupriya et al. [29] discovered during their study on cesarean section women that arterial Dexamethasone decreases the PDPH prevalence on the 1<sup>st</sup> and 7<sup>th</sup> day subsequent spinal anesthesia [30]. According to Kumar et al., with 8mg prophylactic treatment of Dexamethasone increases sternness and PDPH occurrence rate [31].

PDPH usually occurs 24 to 48 hours after a dural puncture. The majority of the locally infiltrated dexamethasone that is systemically absorbed may be attributed to the main preventive effect of dexamethasone seen in this current study, keeping in mind that dexamethasone was given at a single 8-mg dose, which happens to be the minimum therapeutic dose for epidural administration [32]. It could be argued that particulate steroids would have been a better option for achieving long-term therapeutic effects (headache prevention).

## CONCLUSION

Our study found that the prevalence of post-dural puncture headache was lower in dexamethasone group patients but improved with increasing post-operative days and extended to the placebo group. Our findings contradict the earlier studies in regard to dexamethasone's effectiveness in post-dural puncture headache treatment. Based on our findings, dexamethasone cannot be recommended for post-dural puncture headaches.

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