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Sedative Effect of Propofol and Diazepam on Post-Dural Puncture Headache: comparative study in post caesarian section Libyan patient

Ibrahim Garta[1,2,3], Fathi Abulifa[1,2], Abdulrahman eldanfour[2]

[1]Department of Surgery, Faculty of medicine, Misurata University, Libya
[2]Anesthesia Department, Misurata central hospital, Libya
[3]Department of surgery, Aljazeera International Hospital, Misurata, Libya

***Corresponding Author:** Ibrahim Garta | **Received:** 28.02.2025 | **Accepted:** 18.04.2025 | **Published:** 01.05.2025

Abstract: Background: Post-dural puncture headache (PDPH) is a common adverse effect after neuraxial spinal anesthesia, which commonly happens in women undergoing operative (caesarean) delivery. Methods: For the purpose of this study, 90 candidates for spinal anesthesia were split into two groups, A and B. Both groups received spinal anesthesia with heavy bupivacaine. In-group A, 1mg of Diazepam was administered intravenously, while in-group B, propofol was slowly infused at a dose of 30ug per kg per min. The occurrence and severity of headaches (24, 48, and 72 h postoperatively) in both groups were assessed using The Wong-Baker Faces Pain Rating Scale. The data was analyzed using t-tests at a significance level of 0.05. **Results:** Demographic characteristics were homogeneous across both groups ($P > 0.05$). The incidence as well as the severity of headaches showed statistically significant difference as lower in the propofol group compared to the diazepam group ($P < 0.001$). **Conclusions**: Up on the findings of this study, small-dose propofol may be a more effective sedative than diazepam when used during spinal anesthesia to reduce post-dural puncture headache.

Keywords: Pregnancy, Caesarean section, Diazepam, Propofol, Spinal, Headache, PDPH, Libya.

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INTRODUCTION

Post-Dural puncture headache (PDPH) is a significant and well-recognized adverse outcome in spinal anesthesia, particularly in obstetric patients undergoing caesarean sections [1,2]. PDPH occurs when the dura mater, a tough membrane surrounding the spinal cord and brain, is punctured during procedures such as lumbar puncture or spinal anesthesia. This leads to leak of cerebrospinal fluid (CSF), which results in a reduction in CSF pressure and volume, triggering a headache that is distinctly postural in nature—worsening when the patient is upright and alleviated when they lie down.

PDPH is a major concern in obstetric anesthesia, where spinal anesthesia is widely used for caesarean deliveries due to its effectiveness and safety [3]. Women of childbearing age (18-40 years) are more prone to PDPH because of anatomical factors, such as a lower body mass index and hormonal variations, which may contribute to higher risks during spinal procedures. Additionally, the need for spinal anesthesia during caesarean sections, whether elective or emergency, makes PDPH more common in this group [2,3].

The headache following dural puncture is caused by a series of physiological changes. CSF Leakage The dura mater contains CSF, which cushions the brain and spinal cord. When the dura is punctured, CSF leaks into the surrounding tissue, leading to decreased CSF pressure and volume. Intracranial Pressure Changes the drop in CSF volume reduces the brain's buoyancy, causing it to sag or descend slightly this shift stretches the pain-sensitive meninges, which can trigger the intense headache characteristic of PDPH. Cerebral Vasodilation to compensate for the reduction in CSF pressure, cerebral blood vessels dilate, leading to increased blood flow and contributing to the headache. This vasodilation may be linked to secondary symptoms like nausea, photophobia, neck stiffness, and tinnitus. Postural Nature (5,6,7) The hallmark feature of PDPH is its postural component, the headache is significantly worse when the patient is standing or sitting due to the gravitational effects on the already reduced CSF volume, and it improves when the patient lies down [1-4, 8].

PDPH can have a profound impact on postpartum mothers, as it often causes severe discomfort and impairs their ability to care for their newborn. This

complication may prolong hospital stays, increase healthcare costs, and negatively affect the overall recovery experience [9]. Symptoms typically present within 48 hours of the dural puncture but can arise later and last for days to weeks if untreated. The intensity of the headache can range from mild to incapacitating, affecting quality of life and delaying ambulation and recovery.

Factors that influence the incidence and severity of PDPH include. Needle Type and Size: Larger and cutting (Quincke-type) needles have a higher incidence of PDPH in comparison to smaller and non-cutting (pencil-point, such as Whitacre or Sprotte) needles. Number of Puncture Attempts: Multiple dural punctures during spinal anesthesia increase the risk of PDPH,*3*. Patient Demographics: Younger adults, women, and individuals with a history of headaches (e.g., migraines) are more susceptible to PDPH [2,4,7,9].

Prophylactic Measures Some studies suggest that bed rest after the procedure or administering IV fluids or caffeine can help reduce the likelihood of though evidence on the effectiveness of these methods is mixed [7,10,11], Several pharmacological therapies for preventing PDPH have been developed in parturient, including aminophylline, dexamethasone, gabap- entin/pregabalin, hydrocortisone, magnesium, ondansetron, and propofol. However, the results were inconsistent PDPH, in this prospective study we compare both sedative effect of small doses of both propofol and diazepam on PDPH.

METHODS

A comparative analytical study design included 90 pregnant females, of age between 18 and 40 years, ASA class II, who underwent elective cesarean section, Spinal anesthesia was administered to them in Misurata central Hospital, Misurata, Libya, in 2024, were prospectively included in this study. The objective was to evaluate the impact of diazepam and propofol sedative medication dosage on PDPH, the inclusion and exclusion criteria for this study should be applied (table1), following informed consent and if the patients satisfied the requirements for participation, they were split into two groups, P (propofol) and D (diazepam).

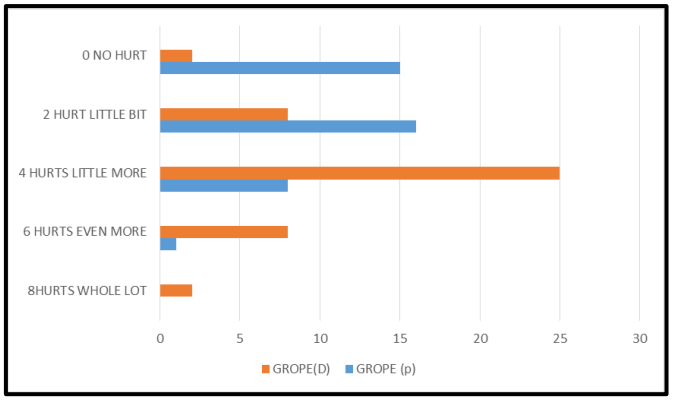
Inclusion criteria

- Patients who are willing to participate.
- Patients without problems in coagulation.
- Patients free of history of headache.
- Absence of any skin infection at the site of anesthesia.
- ASA class II (pregnancy).
- Freedom of seizures history.

Exclusion criteria

- Patients received punctures more than twice for spinal anesthesia.
- If any narcotic agent used during surgery.
- If general anaesthesia was required after spinal anaesthesia.

Twenty minutes before spinal anesthesia was administered, a compensatory volume of 10 mL/kg of normal saline fluid was preloaded into each group. The patient was then put in sitting position, and the skin was cleaned using 7.5% betadine and alcohol gel. Under aseptic conditions, Whitacre pencil-point spinal needles No. 27 were applied to penetrate the subcutaneous tissue in parallel to the spinal nerves. The American Academy of Neurology recommends using pencil-point spinal needles. Spinal Marcaine of volume of 2.0-2.5 cc (10 mg-12.5 mg) of was injected after the dura was penetrated and the cerebrospinal fluid was drawn. The patient was put in a supine posture after the needle was taken out and his skin was dressed with wedge of 15cm under wright hip to decrease hypotension due to aortocavel compression from gravid uterus Once anesthesia was achieved and maintained, 30 µg/kg/min of propofol was gradually injected into group P. group D received an intravenous injection of 1 mg of diazepam. Additionally, phenylephrine 50ug was administered intravenously to both groups if their blood pressure dropped by more than 25% of its starting level. The patient's headache following spinal anesthesia was the primary variable examined in this study. A trained nurse recorded the patient's headache severity as soon as they entered the recovery room and continued to do so for up to 24 hours, using the The Wong-Baker Faces Pain Rating Scale (figure 1). Pain was measured in the checklist constructed particularly for this purpose. The standard treatments for headaches in patients include total rest, water drinking in large amounts, and caffeine drinking and ultimately administering analgesics, paraetamol, 0.5g every six hours in this study protocol.



Figuer-1: Wong-Baker faces pain taking scale results in this study

Statistical Analysis

The pain levels of two groups (Independent groups Group P vs. Group D) were compared applying the Mann-Whitney test. Using the t-test and chi-square tests, the groups' variations in several demographic parameters according to their kind were investigated. SPSS was used for the statistical analysis of the data. The significance level of 0.05 was considered in the present study.

The amount and intensity of headaches following spinal an aesthesia in 90 individuals using the sedatives propofol and diazepam were compared with one another in this study. 50% (45 women) of the participants in this trial were given 30 ug/kg/min of propofol in group P, and 50% (45 women) were given 1 mg of diazepam in group D. The demographic characteristics like height, weight, and BMI did not significantly differ between the two groups and were ultimately showing homogeneity (Table 1).

RESULTS

Table-1: The comparison of Demographic characteristics across study groups[a]

Variables	Propofol	Diazepam	*P* Value
Weight (kg)	81 ± 1.1	77.3±1.2	0.17
Height (cm)	175.1 ± 1.0	176 ±1.0	0.61
BMI	28.2 ± 0.3	27 ±0.1	0.08

[a] Values are expressed as mean ± SEM.

The frequency and rate of headache following spinal an aesthesia in the Diazepam(D) group revealed that 42.2% (19) participants reported no headache, 57.8 % (26) reported headaches;69.2 (18) reported mild headaches,19.2% (5) reported moderate headaches, and 11.5% (3) reported severe headaches. In the Propofol (P) group, 33.3% (15) patients experienced headaches following spinal anesthesia, twelve of them 80% reported having light headaches, while three 20% reported having moderate headaches. There were no major headaches among the members of this group (P), while 66.67% (30) patients did not experience headache. The statistical significance tested by chi-square test analyzing the incidence of headaches in the patients in the two groups indicated that the two groups had a statistically significant difference in between them in terms of the incidence of headaches (P = 0.004), with the incidence of headaches being lower in the participants taken propofol than in the group taken diazepam. Additionally, in the two groups' headache severity was compared applying the Mann-Whitney test. The results of data analysis indicated that there was a significant difference between the two groups' headache severity resulting from the operation, with the Diazepam group experiencing a higher headache severity (P = 0.0004) Table 2.

Table-2: Comparison of Pain Intensity across the Groups of the study

Group	N	Median ± IQR	U statistic*	*P* Value
Propofol	45	2.00 ± 2.00	321.0	< 0.001†
Diazepam	45	6.00 ± 4.00		

IQR Inter-quartile range. *Mann-Whitney U test. †Statistically significant at 95% level of confidence.

DISCUSSION

This study compared the effects of Diazepam and propofol on headaches following spinal anesthesia using a clinical trial. Propofol, when taken in addition to spinal anesthesia in cesarean section patient, was found to have higher efficacy than Diazepam in lowering the frequency and intensity of headaches following spinal cord damage. In the research,

investigators found that Diazepam a useful medication for reducing pain following spinal anesthesia, but it was also effective in reducing headaches. But according to another published data, intrathecal Diazepam had no effect on postoperative headaches when paired with bupivacaine injected into the spinal area. Anyhow, migraine has different pathophysiology and nature from that of PDPH, so; some piece of evidence suggests that medication with propofol controlled migraine headaches successfully. In this context, the findings of our study on patient population undergoing operative delivery, comparison was implemented considering the effectiveness of propofol in alleviating headaches following spinal anesthesia. Additionally, patients who were scheduled for a caesarean section but experienced migraine headaches gained benefit from propofol in relive both types of headaches. A list of other medications, including ondansetron, gabapentin, aminophylline, as well as steroids like dexamethasone and hydrocortisone, are in use for the purpose of controlling this PDPH following spinal anaesthesia in caesarean surgery. However, according to Zhao et al.'s meta-analysis of clinical trial studies, evidence supports the effectiveness and superiority of propofol, ondansetron, and aminophylline [12].

CONCLUSIONS

Post-Dural puncture headache is a common and potentially debilitating complication of spinal anesthesia, particularly in post-caesarean section patients. Propofol is presented as a more effective medication since, according to the current study's findings; it reduces headaches following spinal anesthesia more successfully than Diazepam. As a result, patients who get spinal anesthesia for surgery are advised to gavin this medication in small dosages to prevent and manage headaches following the procedure.

REFERENCES

1. The Basics of Anaesthesia by Pardo M. Miller. Elsevier Health Sciences, Philadelphia, USA, 2022.
2. Tramer MR, Schiffer E, Mazza C, Culebras X, and Elia N. A comprehensive analysis of randomised studies examining clonidine as a supplement to intrathecal local anaesthetics for surgical procedures. 159–67 in Reg Anesth Pain Med. 2008;33(2).
3. Vargarfard J, Damshenas MH, Taban S, Rahmanian M, Pourmokhtari M, Rastgarian A, *et al.* [A double-blind randomised clinical trial examining the impact of fentanyl addition to bupivacaine on shivering, nausea and vomiting in patients having spinal anaesthesia for femoral fracture surgery]. 18(4):9–16; Pars J Med Sci, 2022. Persian.
4. Knox EG, Lewis M, and MacArthur C. Long-term symptoms with unintentional dural punctures in obstetric patients. 1993; 306(6882):883–5, BMJ.
5. Danielson DR, Arnold JJ, Weber JG, Klindworth JT, and Ereth MH. Preventive intravenous caffeine administration and recuperation following ambulatory surgical procedures. 621-6 in Mayo Clinic Proc. 1997;72(7).
6. Jadad AR, Lucas S, Tamayo C, Takeuchi L, Galinski SE, and Choi PT. Parturient meta-analysis of obstetrical data shows that PDPH is a frequent side effect of neuraxial inhibition. 50(5):460-9 in Can J Anaesth. 2003.
7. Taghizadieh A, Marjany K, Soleimanpour M, Taheraghdam A, Ghafouri RR, and Soleimanpour H. Propofol-induced amelioration of refractory migraine headache: case series. 2012; 5(1):19; Int J Emerg Med.
8. Khanderi U, Pandit SK. The anaesthesia application of midazolam hydrochloride. 1967; 6(7):533–47; Clin Pharm.
9. Drummond-Lewis J, Scher C. Propofol: a novel approach to treating migraine headaches that are resistant to treatment. 3(4):366–9 in Pain Med. 2002.
10. Young WB, Rozen TD, Paolone MF, Mendes PM, and Silberstein SD. Propofol administered intravenously for the treatment of refractory headaches. In 2002, Headache, 42(7), 638–41
11. Madan R, Kaul HL, Mohanty PR, and Bharti N. When used with bupivacaine, intrathecal midazolam prolongs and enhances spinal anaesthesia. Skand. Acta Anaesthesiol 2003;47(9):1101–5.
12. Piracicini E, Gambale G, Albarello R, Biagini C, Novi A, and Agnoletti V. In a developing nation, paediatric orthopaedic surgery is performed under spinal anaesthesia and ketamine-midazolam sedation. Intensive Care Cardiovasc Anesth. HSR Proc. 2012;4(3):176–8.