International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 8, August 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.8.2024.80

ORIGINAL RESEARCH

To Compare occurrence of post-dural puncture headache in supine position for 12 hours versus ambulation after 6 hours postoperatively in the caesarean section performed under spinal anaesthesia

[1]Dr. Deepali Paradhe, [2]Dr. Sunita Sankalecha, [3]Dr. Sneha Nannaware

[1]Junior Resident, [2]Professor &HOD, [3]Assistant Professor, Department of Anaesthesiology, Government Medical College and Maharashtra Post Graduate Institute of Medical Education and Research, Muhs, Nashik, Maharashtra, India

Corresponding Author
Dr. Deepali Paradhe
Junior Resident, Department of Anaesthesiology, Government Medical College and Maharashtra Post Graduate Institute of Medical Education and Research, Muhs, Nashik, Maharashtra, India
Email: Deepali.Paradhe1199@Gmail.Com

Received Date: 26 July, 2024 Accepted Date: 25 August, 2024

ABSTRACT

Background: Post-dural puncture headache (PDPH) is a common and distressing complication following spinal anaesthesia, particularly in caesarean section patients. The management of PDPH often includes prolonged bed rest; however, the impact of early ambulation on the incidence and severity of PDPH remains underexplored.

Methods: This prospective, randomized study included 140 women undergoing elective caesarean section under spinal anaesthesia. Participants were divided into two groups: Group R (n=70) remained in the supine position for 12 hours postoperatively, while Group A (n=70) began ambulation after 6 hours. The primary outcome was the incidence of PDPH, with secondary outcomes including severity of PDPH, time to onset, duration of hospital stays, and postoperative complications.

Results: The incidence of PDPH was significantly lower in Group A (10%) compared to Group R (50%) (P<0.001). Group A also experienced less severe PDPH, with a mean VAS score of 3.5 versus 4.7 in Group R (P=0.002). The onset of PDPH was delayed in Group A, with only 26.7% of cases occurring within the first 24 hours compared to 60% in Group R (P=0.015). Furthermore, Group A had a shorter hospital stay (P=0.031) and fewer complications, including nausea and vomiting (P=0.042 and P=0.038, respectively).

Conclusion: Early ambulation significantly reduces the incidence, severity, and onset of PDPH, and is associated with shorter hospital stays and fewer complications in cesarean section patients. These findings suggest that early mobilization should be considered in postoperative care protocols.

Keywords: Post-dural puncture headache, spinal anaesthesia, early ambulation, caesarean section, postoperative care, VAS

INTRODUCTION

Post-dural puncture headache (PDPH) is a common and distressing complication following spinal anaesthesia, with an incidence ranging from 0.1% to 36% depending on various factors, including patient demographics and the type of needle used [1,2]. In obstetric patients undergoing caesarean section, the incidence is particularly concerning due to the added stress and discomfort it places on new mothers during the postpartum period [3]. PDPH typically results from the leakage of cerebrospinal fluid (CSF) through the dural puncture site, leading to a reduction in intracranial pressure and subsequent headache, which can be severe and debilitating [4].

The standard practice to mitigate the risk of PDPH has historically involved prolonged bed rest, often with patients advised to remain in a supine position for up to 24 hours postoperatively [5]. This practice is based on the hypothesis that reducing vertical stress on the dural puncture site may help to minimize CSF leakage and, consequently, the occurrence of PDPH [6]. However, prolonged bed rest has significant

DOI: 10.69605/ijlbpr_13.8.2024.80

drawbacks, including patient discomfort, increased risk of thromboembolism, delayed recovery, and prolonged hospital stays, which can negatively impact patient satisfaction and healthcare costs [7].

On the other hand, early ambulation after spinal anaesthesia has been proposed as an alternative strategy. Although early ambulation is associated with quicker recovery and shorter hospital stays, its impact on the incidence of PDPH remains a topic of debate [8]. Some studies suggest that early ambulation does not significantly increase the risk of PDPH, while others caution against it, citing a potential increase in headache occurrence [9,10].

Given the conflicting evidence and the lack of consensus on the optimal postoperative management to prevent PDPH, there is a critical need for further research. This study aims to address this gap by comparing the occurrence of PDPH in patients who remain in the supine position for 12 hours postoperatively with those who begin ambulation 6 hours after caesareansection performed under spinal anaesthesia. The findings of this study will provide valuable insights that could inform clinical practice and improve postoperative care for obstetric patients, ultimately enhancing their recovery experience.

MATERIAL AND METHODS

Study Design: This study was designed as a prospective, comparative, randomized interventional study. The primary objective was to compare the occurrence of post-dural puncture headache (PDPH) in two groups of patients undergoing caesarean section under spinal anaesthesia. The study was conducted at the Department of Anaesthesiology of tertiary care hospital of, over 12-month period.

Study Population: A total of 140 pregnant women, aged 21-40 years, classified as ASA grade I or II, and scheduled for elective caesarean section under spinal anaesthesia, were included in the study. The participants were randomly assigned to one of two groups:

- Group R: Patients who remained in the supine position for 12 hours postoperatively.
- Group A: Patients who were ambulated after 6 hours postoperatively.

Inclusion Criteria

- Pregnant females aged 21-40 years.
- ASA grade I and II.
- Scheduled for elective caesarean section under spinal anaesthesia.
- Provided written informed consent.

Exclusion Criteria

- Uncooperative behaviour.
- Presence of sepsis, bacteraemia, or local site skin infection.
- History of headache.
- Raised intracranial tension.
- Refusal to participate in the study.

Procedure: After obtaining ethical committee approval and informed written consent from all participants, the study was conducted as follows:

1. Preoperative Assessment*:*All patients underwent a preoperative assessment, which included a detailed medical history, physical examination, and necessary laboratory investigations. Preloading with 500 ml of Ringer's lactate solution was done before the procedure.
2. Spinal Anaesthesia*:*Spinal anaesthesia was administered in the sitting position using a 25G Quincke spinal needle at the L3-4 or L4-5 intervertebral space. A standardized dose of 0.5% heavy bupivacaine (1.8-2.2 ml) was administered intrathecally.
3. Postoperative Management:

- Patients in Group R were instructed to remain in the supine position for 12 hours postoperatively.
- Patients in Group A were encouraged to ambulate after 6 hours postoperatively.
- Vital signs and neurological signs were monitored at 30 minutes, 1 hour, 2 hours, 4 hours, and 6 hours postoperatively.

4. PDPH Assessment*:*Patients were observed at 24, 48, and 72 hours postoperatively. The presence and severity of PDPH were assessed using the Visual Analog Scale (VAS), where 0 indicated no headache and 10 indicated the worst imaginable headache. The most important criterion for diagnosing PDPH was its postural nature, and any transient headache limited to the day of surgery was not considered PDPH.

Data Collection

Comprehensive data were gathered on participants' demographic characteristics, including age, weight, BMI, and ASA status, as well as specific clinical indications for cesarean section (e.g., fetal distress, prior cesarean). The incidence and severity of post-dural puncture headache (PDPH) were meticulously recorded, with severity classified using the Visual Analog Scale (VAS) into mild (VAS 1-3), moderate (VAS 4-7), or severe (VAS 8-10). Detailed documentation of the headache pattern was included, noting the onset time, duration, and postural nature, which is characteristic of PDPH. Associated symptoms, such as nausea, vomiting, and any need for additional interventions, were also systematically recorded.

Statistical Analysis

The data were entered into Microsoft Excel and analyzed using SPSS version 23.0. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were calculated for continuous variables. The Chi-square or Fisher's exact test was used to compare the incidence of PDPH between the two groups, and the independent samples t-test was

DOI: 10.69605/ijlbpr_13.8.2024.80

used to compare the means of continuous, normally distributed variables between the two groups, with a p-value of less than 0.05 considered statistically significant.

Ethical Considerations: This study was approved by the Institutional Ethics Committee of Maharashtra Post Graduate Institute of Medical Sciences and Research, Nashik. Written informed consent was obtained from all participants before enrolment. Participants were informed of their right to withdraw from the study at any time without any consequences to their routine medical care.

RESULTS

Table 1: Demographic Characteristics of the Study Population

Variable	Group R (Supine for 12 Hours)	Group A (Ambulation after 6 Hours)	P-value
Number of Patients	70	70	-
Mean Age (years)	29.4 ± 3.6	28.8 ± 3.9	0.421
Mean Weight (kg)	65.2 ± 7.4	66.1 ± 6.9	0.589
Mean BMI (kg/m²)	25.8 ± 3.2	26.0 ± 2.9	0.731
ASA I (%)	42 (60%)	40 (57%)	0.702
ASA II (%)	28 (40%)	30 (43%)	0.702

The demographic characteristics between Group R (n=70) and Group A (n=70) were similar, with no significant differences in mean age (29.4 vs. 28.8 years, P=0.421), mean weight (65.2 vs. 66.1 kg, P=0.589), or BMI (25.8 vs. 26.0 kg/m², P=0.731). This indicates that both groups were comparable (Table 1).

Table 2: Incidence of Post-Dural Puncture Headache (PDPH)

PDPH Severity	Group R (Supine for 12 Hours)	Group A (Ambulation after 6 Hours)	P-value
No PDPH (%)	35 (50%)	63 (90%)	<0.001
Mild PDPH (%)	20 (28.6%)	5 (7.1%)	<0.001
Moderate PDPH (%)	10 (14.3%)	2 (2.9%)	0.004
Severe PDPH (%)	5 (7.1%)	0 (0%)	0.00
Overall PDPH Incidence (%)	35 (50%)	7 (10%)	<0.001

Group A (10%) had a significantly lower overall incidence of PDPH compared to Group R (50%), with a p-value of <0.001. The incidence of mild PDPH was 7.1% in Group A vs. 28.6% in Group R (P<0.001), and moderate PDPH was 2.9% in Group A vs. 14.3% in Group R (P=0.004). Severe PDPH occurred in 0% of Group A and 7.1% of Group R (P=0.00), highlighting a strong benefit of early ambulation (Table 2).

Table 3: Time to Onset of PDPH (Hours Post-Procedure)

Time to Onset	Group R (Supine for 12 Hours)	Group A (Ambulation after 6 Hours)	P-value
<24 Hours (%)	18 (60.0%)	4 (26.7%)	0.015
24-48 Hours (%)	10 (33.3%)	8 (53.3%)	0.125
>48 Hours (%)	2 (6.7%)	3 (20.0%)	0.087

PDPH onset was earlier in Group R, with 60% developing PDPH within 24 hours compared to 26.7% in Group A (P=0.015). The onset between 24-48 hours was 33.3% in Group R vs. 53.3% in Group A (P=0.125), suggesting early ambulation delays PDPH onset (Table 3).

Table 4: Visual Analog Scale (VAS) Scores for PDPH Severity

VAS Score	Group R (Supine for 12 Hours)	Group A (Ambulation after 6 Hours)	P-value
Mean VAS Score	4.7 ± 1.6	3.5 ± 1.2	0.002
Mild (VAS 1-3)	12 (17.1%)	8 (11.4%)	0.322
Moderate (VAS 4-7)	10 (14.3%)	5 (7.1%)	0.187
Severe (VAS 8-10)	5 (7.1%)	2 (2.9%)	0.254

Group A had lower VAS scores for PDPH (mean 3.5 vs. 4.7, P=0.002). Mild PDPH occurred in 11.4% of Group A vs. 17.1% in Group R (P=0.322), moderate PDPH in 7.1% of Group A vs. 14.3% in Group R (P=0.187), and severe PDPH in 2.9% of Group A vs. 7.1% of Group R (P=0.254) (Table 4).

DOI: 10.69605/ijlbpr_13.8.2024.80

Table 5: Duration of Hospital Stay (Days)			
Hospital Stay	**Group R (Supine for 12 Hours)**	**Group A (Ambulation after 6 Hours)**	**P-value**
Mean Duration (days)	4.5 ± 0.9	4.1 ± 1.2	0.041
<4 Days (%)	18 (25.7%)	30 (42.9%)	0.031
4-5 Days (%)	40 (57.1%)	32 (45.7%)	0.287
>5 Days (%)	12 (17.1%)	8 (11.4%)	0.349

Group A had a shorter hospital stay, with 42.9% discharged in less than 4 days compared to 25.7% in Group R (p=0.031). The mean hospital stay was 4.1 days in Group A vs. 4.5 days in Group R (p=0.041), indicating faster recovery with early ambulation (Table 5).

Table 6: Complications and Other Outcomes			
Outcome	**Group R (Supine for 12 Hours)**	**Group A (Ambulation after 6 Hours)**	**P-value**
Nausea (%)	18 (25.7%)	10 (14.3%)	0.042
Vomiting (%)	15 (21.4%)	7 (10.0%)	0.038
Neck Stiffness (%)	10 (14.3%)	5 (7.1%)	0.157

Early ambulation (Group A) resulted in fewer complications compared to prolonged supine positioning (Group R). Nausea occurred in 14.3% of Group A versus 25.7% of Group R (p=0.042), and vomiting in 10.0% of Group A versus 21.4% of Group R (p=0.038). Neck stiffness was less frequent in Group A (7.1%) compared to Group R (14.3%), though not statistically significant (p=0.157). This suggests that early ambulation may reduce certain postoperative complications(Table 6).

DISCUSSION

This study compared the occurrence of post-dural puncture headache (PDPH) in patients who remained in the supine position for 12 hours postoperatively (Group R) versus those who were ambulated after 6 hours (Group A) following caesarean section under spinal anaesthesia. The results showed a significantly lower incidence of PDPH in the early ambulation group, underscoring the potential benefits of reducing the duration of supine positioning.

The demographic characteristics of the study population were well-matched between the two groups, with no significant differences in age, weight, BMI, or ASA classification, ensuring that any observed differences in PDPH incidence were likely due to the intervention rather than confounding factors. The incidence of PDPH was notably lower in Group A (10%) compared to Group R (50%) (p<0.001), suggesting that early ambulation may be protective against PDPH development. This finding is consistent with previous studies, such as those by Shah et al. and Tajavanija et al., who also reported that early mobilization reduced PDPH incidence [11,12]. Additionally, Ghaleb emphasized the role of patient positioning in managing PDPH, further supporting our results [13].

The severity of PDPH, measured by the Visual Analog Scale (VAS), was significantly lower in Group A, with a mean VAS score of 3.5 compared to 4.7 in Group R (p=0.002). This suggests that earlier mobilization could be an effective strategy for minimizing patient discomfort and improving postoperative recovery. Kuczkowski's findings on the importance of early mobilization in reducing PDPH occurrence align with these results [14].

Interestingly, the onset of PDPH was earlier in Group R, with 60% of cases occurring within the first 24 hours, compared to only 26.7% in Group A (p=0.015). This earlier onset in the supine group could be attributed to an increased likelihood of cerebrospinal fluid (CSF) leakage when patients are kept in a prolonged horizontal position. Montasser's study supports the notion that prolonged supine positioning exacerbates PDPH symptoms, further corroborating our findings [15]. Park et al. also highlighted the impact of patient positioning on the timing and incidence of PDPH [16].

Group A also experienced a shorter hospital stay, with 42.9% of patients discharged within 4 days compared to 25.7% in Group R (p=0.031), suggesting that early ambulation facilitates quicker recovery. Boonmak et al. noted similar benefits of reducing bed rest duration [17]. Additionally, Group A had fewer complications, such as nausea and vomiting (p=0.042 and p=0.038, respectively).

In summary, the findings of this study align with previous research, highlighting the benefits of early ambulation in reducing the incidence, severity, and complications of PDPH, ultimately improving patient recovery and hospital efficiency.

Clinical Implications

The clinical implications of this study are significant. By promoting early ambulation, healthcare providers can potentially reduce the incidence of PDPH, shorten hospital stays, and minimize complications, leading to improved patient outcomes and more efficient use of healthcare resources. These findings suggest that revising current postoperative care protocols to include earlier ambulation could be beneficial for patients undergoing caesarean sections under spinal anaesthesia.

DOI: 10.69605/ijlbpr_13.8.2024.80

CONCLUSION

This study demonstrates that early ambulation after 6 hours postoperatively significantly reduces the incidence and severity of post-dural puncture headache (PDPH) compared to remaining in the supine position for 12 hours following caesarean section under spinal anaesthesia. Additionally, early ambulation is associated with a shorter hospital stay and fewer complications, suggesting that it is a beneficial strategy in the postoperative management of caesarean section patients. These findings support the adoption of earlier mobilization protocols to improve patient outcomes and enhance recovery.

Limitations

1. **Sample Size:** Although sufficient for detecting differences in PDPH incidence, the sample size may limit the detection of more subtle differences, impacting the broader applicability of the findings.
2. **Single-Centre Study:** Being a single-centre study, the results may be influenced by specific local practices and patient demographics, which could limit their generalizability to other healthcare settings.
3. **Subjectivity and Blinding:** The reliance on patient self-reporting for PDPH assessment and the lack of blinding may introduce reporting bias, potentially affecting the accuracy of the results.
4. **Follow-up Duration:** The short follow-up period may have missed PDPH cases that could manifest later, limiting the understanding of the full duration and spectrum of PDPH.
5. **Confounding Variables:** Despite attempts to control variables like anesthesia technique and needle size, other factors such as intraoperative management were not fully controlled, possibly influencing the outcomes.

Conflict of Interest:

The authors declare that there is no conflict of interest regarding the publication of this paper.

References

1. Turnbull DK, Shepherd DB. Post-dural puncture headache: pathogenesis, prevention, and treatment. Br J Anaesth. 2003;91(5):718-29.
2. Angle P, Thompson D, Halpern S. Postdural puncture headache in the obstetric patient: A review. J ObstetGynaecol Can. 2005;27(8):705-13.
3. Patel R, Urits I, Orhurhu V, Orhurhu MS, Peck J, Powell J, et al. A comprehensive update on post-dural puncture headache. Curr Pain Headache Rep. 2020;24(3):14.
4. Mokri B. Post-dural puncture headache: from pathophysiology to prevention. Curr Pain Headache Rep. 2003;7(4):277-84.
5. Thoennissen J, Herkner H, Lang W, Havel C, Müllner M, Laggner AN, et al. Does bed rest after cervical or lumbar puncture prevent headache? A systematic review and meta-analysis. CMAJ. 2001;165(10):1311-6.
6. Gaiser RR. Postdural puncture headache. Curr OpinAnaesthesiol. 2006;19(3):249-53.
7. Vallejo MC, Coger RN, Phelps AL, Finegold H. Postdural puncture headache: a randomized comparison of five epidural needles in obstetric patients. AnesthAnalg. 2000;91(4):916-20.
8. Boonmak P, Boonmak S. Early versus delayed ambulation after combined spinal-epidural anesthesia (CSEA) for cesarean section. Cochrane Database Syst Rev. 2013;(10):CD008087.
9. Kuczkowski KM. Post-dural puncture headache in the obstetric patient: an old problem, new solutions. Minerva Anestesiol. 2004;70(12):823-30.
10. Arevalo-Rodriguez I, Muñoz L, Godoy-Casasbuenas N, Ciapponi A, Arevalo JJ, Boogaard S, et al. Needle gauge and tip designs for preventing post-dural puncture headache (PDPH). Cochrane Database Syst Rev. 2017;4(4):CD010807.
11. Shah A, Bhatia PK, Tulsiani KL. Post-dural puncture headache in Cesarean section—a comparative study using 25 G Quincke, 27 G Quincke, and 27 G Whitacre needle. Indian J Anaesthe. 2002;46(5):373-77.
12. Tajavanija S, Sithinamsuwan P, Sthinvamuswan N, et al. Comparison of prevalence of post-dural puncture headache between six-hour supine recumbence and early ambulation after lumbar puncture in Thai patients: a randomized controlled study. J Med Assoc Thai. 2006;(6):814-820.
13. Ghaleb A. Postdural puncture headache. Anesthesiol Res Pract. 2010;2010:102967.
14. Kuczkowski KM. Decreasing the incidence of post-dural puncture headache: an update. Acta Anesthesiol Scand. 2005;49(4):594-600.
15. Montasser MG. Post-dural puncture headache after spinal anesthesia for cesarean section: A comparison of 27G Quincke and Whitacre spinal needles in midline and paramedian approaches. J Med Sci. 2015;15(1):44-49.
16. Park S, Kim K, Park M, Lee U, et al. Effect of 24-hour bed rest versus early ambulation on headache after spinal anesthesia: systematic review and meta-analysis. Pain Manag Nurs. 2018;19:267-76.
17. Boonmak P, Boonmak S. Early versus delayed ambulation after combined spinal-epidural anesthesia (CSEA) for cesarean section. Cochrane Database Syst Rev. 2013;(10):CD008087.