

“To evaluate the effect of sitting vs left lateral decubitus position during sub-arachnoid block on occurrence of post-dural puncture headache in patients undergoing lower segment caesarean section.”

DR. YOGITA SORTE, ASSISTANT PROFESSOR, DEPARTMENT OF ANAESTHESIOLOGY, PEOPLE’S COLLEGE OF MEDICAL SCIENCES AND RESEARCH CENTRE, BHOPAL.

DR. SHAILESH MISHRA, ASSISTANT PROFESSOR, DEPARTMENT OF ANAESTHESIOLOGY, PEOPLE’S COLLEGE OF MEDICAL SCIENCES AND RESEARCH CENTRE, BHOPAL.

DR. CHANDRAKANT, ASSOCIATE PROFESOR, DEPARTMENT OF ANAESTHESIOLOGY, A.B.V.GMC, VIDISHA

Corresponding Author DR. YOGITA SORTE, ASSISTANT PROFESSOR, DEPARTMENT OF ANAESTHESIOLOGY, PEOPLE’S COLLEGE OF MEDICAL SCIENCES AND RESEARCH CENTRE, BHOPAL.

ABSTRACT- ”To evaluate the effect of sitting vs left lateral decubitus position during sub-arachnoid block on occurrence of post-dural puncture headache in patients undergoing lower segment caesarean section.

Aims and Objectives: The present study was carried out in 200 patients of ASA grade I/II, posted for lower segment caesarean section from October 2023 to March 2024 at People’s College of Medical Sciences and Research Centre, Bhopal with aims of:

- To find out role of the position of patient in the occurrence of postdural puncture headache.
- Incidence of PDPH in sitting position vs left lateral decubitus position.
- Onset and duration of PDPH in both positions.
- Comparison of ease of technique in both positions.
- Haemodynamic parameters of the patients in both positions.

Methodology: 200 patients of ASA grade I and II between the ages of 18 and 40 years, who underwent lower segment caesarean section.

Patients were randomly divided into two groups:

1. Group A (n=100): Patients given subarachnoid block in sitting position.

2. Group B (n=100): Patients given subarachnoid block in left lateral decubitus position

- **STATISTICAL ANALYSIS:** The categorical data will be presented as numbers % and compared by Chi-square test. The quantitative data will be presented as mean \pm standard deviation and compared by Student’s t-test ($P < 0.05$ as statistically significant).

- **CONCLUSION:** It is unclear as to whether the position of the patient during subarachnoid blockade leads to the occurrence of PDPH. The aim of this study was to compare the effect of the sitting and the left lateral decubitus position during subarachnoid blockade on the occurrence and severity of PDPH in the patients.

KEYWORDS: Subarachnoid block, post dural puncture headache, sitting position, left lateral decubitus position, lower segment caesarean section.

- **INTRODUCTION** Lower segment caesarean sections are almost universally done under subarachnoid blockade, as they provide excellent sensory and motor blockade. Subarachnoid blockade requires minimal apparatus, is easy to expertise, maintains blood chemistry and maintains foeto-maternal arterial blood gases.
- It also avoids the risk of aspiration and the risk of placental transfer of anaesthetic agents. Sub-arachnoid block can be given in the sitting or left lateral decubitus position. Each position has its own advantages and disadvantages. The

advantage of the sitting position is that midline structures can be easily identified in obese patients. The left lateral decubitus position is more appropriate in frail and ill patients because there is less risk of orthostatic hypotension. In the obstetric population, it has the added advantage of avoiding compression of the major vessels such as the aorta and the inferior vena cava, thus avoiding the risk of supine hypotension syndrome which can accentuate the hypotension caused by the sympathetic blockade.

- In the left lateral decubitus position, there is a better spread of the local anaesthetic, thus resulting in better sensory blockade. The only concern in the left lateral decubitus position is the compression of the axillary neurovascular structures (axillary artery, axillary vein, brachial plexus and lymph nodes).
- Headache in the postoperative period could be a post-dural puncture headache (PDPH) or could be unrelated to subarachnoid block. In pregnancy, the reported incidence of PDPH is 0.3% to 40%. The risk factors are size of the spinal needle, its design, direction of the bevel of spinal needle, number of times the dura is punctured, age, gender, pregnancy status and occurrence of PDPH in a previous surgery. Apart from all these factors, the patient's position during dural puncture (sitting or left lateral decubitus) also influences the occurrence of PDPH.
- PDPH has a characteristic feature that it arises within 72 h in 90% of patients. From the site of the dural puncture, there is a continuous leakage of cerebrospinal fluid (CSF) which leads to a decrease in the CSF pressure and this produces traction on the cranial nerves to cause headache.
- PDPH has a fronto-occipital distribution. Its hallmark is that its severity increases on standing and decreases in the supine position. It is distressing to the patient, delays discharge from hospital and impedes breast feeding and maternal care of the neonate.
- It is unclear as to whether the position of the patient during subarachnoid blockade leads to the occurrence of PDPH. The aim of this study was to compare the effect of the sitting and the left lateral decubitus position during subarachnoid blockade on the occurrence and severity of PDPH in the patients.

AIMS AND OBJECTIVES

This prospective interventional study was carried out in 200 patients of ASA grade I/II, posted for lower segment caesarean section from October 2023 to March 2024 at People's College of Medical Sciences and Research Centre, Bhopal with aims of:

- To find out role of the position of patient in the occurrence of postdural puncture headache.
- Incidence of PDPH in sitting position vs left lateral decubitus position.
- Onset and duration of PDPH in both positions.
- Comparison of ease of technique in both positions.
- Haemodynamic parameters of the patients in both positions.

MATERIAL AND METHODS

After approval from the Institutional Ethics Committee (Registration no. ECR/519/Inst/MP/2014/RR-20) and CTRI/2023/10/058813 and informed written consent from patients, the present study was carried out in the Department of Anaesthesiology, People's College of Medical Sciences And Research Centre, Bhopal.

200 patients of ASA grade I and II between the ages of 18 and 40 years, who underwent lower segment caesarean section.

All the patients were subjected to detailed pre-anaesthetic evaluation with clinical history and systemic examination. Routine investigations like Haemogram, Random blood sugar, renal profile, urine examination, X - ray chest and ECG were done.

INCLUSION CRITERIA:

- 200 patients of ASA grade I and II between the ages of 18 and 40 years, who underwent lower segment caesarean section.

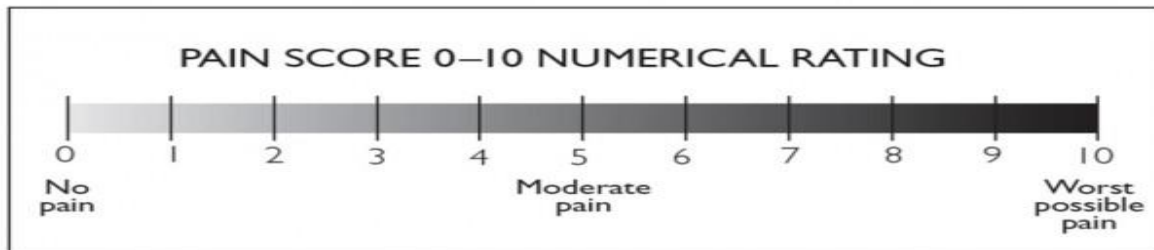
EXCLUSION CRITERIA:

- Difficult subarachnoid block
- Multiple pricks during subarachnoid block

- Emergency LSCS
- Patients with haematological disease,
- bleeding or coagulation test abnormalities,
- psychiatric diseases,
- diabetes,
- history of drug abuse and
- allergy to local anaesthetics of the amide type.

In the operation theatre, attach all the monitors e.g. ECG, NIBP, Pulse oximetry. All the patients were preloaded with 10ml/kg of Ringer lactate. The aspiration prophylaxis were given. The subarachnoid block was administered with 2.2 ml of 0.5% hyperbaric Bupivacaine by a 25 guage Quincke spinal needle either in the sitting position (group A) or in the left lateral decubitus position (group B). The needle was introduced with the bevel parallel to the sagittal plane. The technique was lumbar puncture in the midline approach at the L3-L4 interspinal space using a standard precaution and procedure.

- In the left lateral decubitus position, patient lay on their left side parallel to the rim of the operating table, their thighs were bent on their belly, and their neck was flexed to enable the forehead to be as close as possible to the knees.
- When the surgery was completed, the patients were transferred to the post-anaesthesia care unit. The patients were enquired about PDPH on postoperative days 1, 2, 3, 4 and 5. The severity was evaluated by the **Numeric Rating scale**.



STATISTICAL ANALYSIS:

We included 100 patients per group.

- The incidence of PDPH and its severity were the primary outcomes and associated symptoms such as nausea, vomiting and photophobia were the secondary outcomes in the study.
- The following factors were evaluated – age, weight, height, body mass index (BMI), PDPH and PONV.
- Student’s independent sample t test was used to compare age, weight, height and BMI between the two groups, and the chi-square test was used to assess the relationship between the position and complications (PDPH and PONV).
- The categorical data was presented as numbers % and compared by Chi-square test. The quantitative data was presented as mean ± standard deviation and compared by Student’s t-test (P < 0.05 as statistically significant).

OBSERVATIONS AND RESULTS

A total of 200 patients who had been scheduled for lower segment caesarean section with ASA I and II status were randomly distributed into two groups (Table 1)

Table 1.

Patient Characteristics^a

Variable	Sitting Position (n=100)	Left Lateral decubitus position (n=100)	P Value
Age, years	26.38 (5.48)	27.35 (5.47)	>0.05 (NS)
Height, cm	157.83 (5.24)	158.94(7.34)	>0.05 (NS)

Weight, Kg	75.46 (13.88)	74.13 (15.36)	>0.05 (NS)
BMI, Kg/m ²	30.24 (4.55)	28.47 (4.73)	>0.05 (NS)

^aValues are expressed as mean (SD).

No patients were switched to general anaesthesia.

The overall incidence of PDPH was 12.7% (12 patients out of 200). Ten patients (20.7%) had PDPH in the sitting group and only three patients (4.2%) in the left lateral dcubitus group (P=0.017) (Table 2).

Table 2.
Incidence of PDPH in Various Times^a

Variable	Sitting Position (n=100)	Left Lateral decubitus position (n=100)	P Value
Incidence of PDPH	10 (20.6)	2 (4.4)	0.016
Incidence of PDPH on POD 1	6 (10.2)	0	>0.05 (NS)
Incidence of PDPH on POD 2	7 (14.8)	1 (2.4)	>0.05 (NS)
Incidence of PDPH on POD 3	9 (18.6)	2 (4.2)	0.02

Abbreviation : POD, post-operative day.

^aValues are expressed as No. (%).

The incidence of the PDPH was higher in the sitting group on the first, second and third post-operative days (P=0.0001) (Table 3).

Table 3.

Difference in Intensity of PDPH in Various Times^{a,b}

Variable	Sitting Position (n=100)	Left Lateral decubitus position (n=100)	P Value
Incidence of the PDPH on POD 1	0.6 (1.18)	0	0.0001
Incidence of the PDPH on POD 2	0.67 (1.4)	0.08 (0.46)	0.0001
Incidence of the PDPH on POD 3	1.06 (2.42)	0.12 (0.54)	0.0001

^aValues are expressed as mean (SD).

The highest sensory block level in the sitting group and in the left lateral decubitus group was T6 (thoracic vertebrae) (P=0.002). The mean sensory block duration in the sitting group and in the left lateral decubitus group was 140 and 136 minutes, respectively (P=0.32).

Table 4.
Patient Variables^a

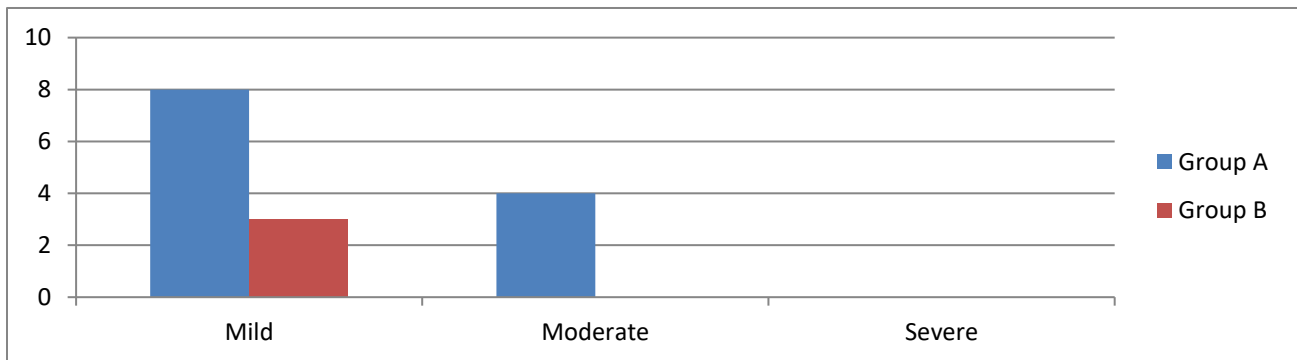
Variable	Sitting Position (n=100)	Left Lateral decubitus position (n=100)	P Value
Sensory block level (T6)	5.04 (0.84)	4.70 (0.94)	0.002
Sensory block duration, minutes	140.12 (18.44)	136.24 (19.14)	>0.05 (NS)
Nausea	10 (20.6)	0	0.001
Vomiting	5 (10.6)	0	>0.05 (NS)
Nausea and Vomiting	10 (20.6)	0	0.001

^aValues are expressed as mean (SD) or No.(%).

The incidence of nausea and vomiting (concomitant symptoms of PDPH) in the sitting position patients (20.6%) was remarkably more common than that in the left lateral decubitus position patients (P=0.001) (Table 4). No significant relationship was observed between PDPH and patients' BMI in both groups (P=0.074).

^bSeverity of headache measured by NRS scale (0-10).

In group A, out of 10 patients with PDPH, 8 (66%) patients had mild and 4 (33%) patients had moderate PDPH. In group B, all 3 (100%) patients had mild PDPH. None had a severe headache. (Figure 1).



(Figure 1)

Difference in the severity of PDPH by Numeric Rating Scale.

In both the groups, comparison of the ease of technique were found not significant.

In both the groups, haemodynamic parameters of the patients were also found not significant.

DISCUSSION

This study showed that the incidence and intensity of PDPH were higher in the sitting position than that in the left lateral decubitus position in lower segment caesarean section.

This study used a rigorous definition of PDPH as a postdural headache in the frontal or occipital area, and its symptoms are aggravated by assuming the sitting position and are alleviated by recumbency. One of the most important reasons for longer stay in the hospital and increase in total expenditure of patients in PDPH and it is complication that should not be treated lightly. PDPH is a direct consequence of the puncture hole in the dura, which results in the loss of CSF at a rate exceeding production. Loss of CSF causes the downward displacement of the

brain and the stretching of the sensitive supporting structures. The other reason for PDPH may be the distention of blood vessels, which compensate for the loss of CSF because of the fixed volume of the skull.

The spinal dura mater is a tough membrane and is the outer layer of the meninges surrounding the brain and the spinal cord. When the dura mater is perforated, the CSF leaks through it until it is closed either by intervention or through healing. Failure to close the dural perforation may lead to adhesions, continuous CSF leakage, and risk of infection.

The fibroblastic proliferation of the surrounding tissue and blood clot facilitate the process of healing of the dura mater. The fibroblastic proliferation emerges from the cut edges of the dura. It is possible that a spinal needle carefully placed in the subarachnoid space does not promote dural healing as trauma to adjacent tissue is minimal. The healing of the dura is longer in the sitting position than in the left lateral decubitus position because the intervertebral spaces are more evident in the sitting position. Therefore, the block is performed more easily and is less traumatic, and the CSF leakage is longer.

Second, CSF pressure in the sitting position is 40 cmH₂O and that in the left lateral decubitus position is 5-20 cmH₂O. In the sitting position, this higher CSF pressure can make a larger hole in the dura and can cause a prolonged CSF leak.

Third, the needle is perpendicular to the outer dura fiber in the sitting position, thus causing a larger hole and more CSF leakage.

The incidence of PDPH can be as low as 5% with smaller-diameter, non-cutting, “pencil-point” spinal needles and as high as 86% with large-bore needles.

In our study, the incidence of PDPH was 12.7% with a 25-gauge Quincke spinal needle. Similar to previous studies, PDPH was significantly lower when the subarachnoid was performed in the left lateral decubitus position than in the sitting position.

CONCLUSION

We conclude that there is a decreased incidence and severity of PDPH when the subarachnoid block is administered in the left lateral decubitus position as compared to that given in the sitting position. Thus, it is preferable to give subarachnoid in the left lateral decubitus position.

REFERENCES

1. Hirachan N Incidence of post dural puncture headache in parturients following early ambulation and recumbency Journal of Patan Academy of Health Sciences 2017 4 14 20
2. Öztürk İ, Sirit I, Yazicioglu D A retrospective evaluation of the effect of patient position on post dural puncture headache: Is sitting position worse? Anaesth Pain Intensive Care 2015 19 130 4
3. Ali DM, Sharif A, Naqvi SE Comparison of the hemodynamic effects of lateral and sitting positions during induction of spinal anaesthesia for caesarean section using Hyperbaric Bupivacaine Pak Armed Forces Med J 2018 68 45 9
4. Davoudi M, Tarbait M, Ebadian MR, Hajian P Effect of position during spinal anesthesia on postdural puncture headache after caesarean section: A prospective, single-blind randomized clinical trial Anesth Pain Med 2016 6 e35486
5. Chekoi B, Yetneberk T, Teshome D Prevalence and associated factors of post dural puncture headache among parturients who underwent cesarean section with spinal anesthesia: A systematic review and meta-analysis Ann Med Surg 2021 66 102456

6. Parthasarathy S, Sivashanmugham T Incidence of post dural puncture headache in Indian population:a need for a relook Asian J Pharm Clin Res 2016 9 230 2
7. Majd SA, Pourfarzam S, Ghasemi H, Yarmohammadi ME, Malati A, Jaberian M Evaluation of pre lumbar puncture position on post lumbar puncture headache J Res Med Sci 2011 16 282 6
8. Zorrilla-Vaca A, Makkar JK Effectiveness of lateral decubitus position for preventing post-dural puncture headache:A meta-analysis Pain Physician 2017 20 E521 9
9. Chakraborty A, Sinha A The incidence of post dural puncture headache following spinal anaesthesia:A comparison of sitting versus lateral decubitus position J Contemp Med Res 2016 3 2096 9
10. Puthenveetil N, Rajan S, Mohan A, Paul J, Kumar L Sphenopalatine ganglion block for treatment of post-dural puncture headache in obstetric patient:An observational study Indian J Anaesth 2018 62 9727