Comparison of sitting versus lateral decubitus position during spinal anaesthesia on the occurrence of post-dural puncture headache in patients undergoing lower segment caesarean section: A randomised controlled trial

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.[1,2]

It also avoids the risk of aspiration and the risk of placental transfer of anaesthetic agents. Spinal anaesthesia can be given in the sitting, lateral, or rarely prone posture. Each posture has its own advantages and disadvantages. The lateral posture is more appropriate in frail and ill patients because there is less risk of orthostatic hypotension.[3,4] The advantage of the sitting posture is that midline structures can be easily identified in obese patients. 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 lateral recumbent posture, there is a better spread of the local anaesthetic, thus resulting in better sensory blockade. The only concern in the lateral posture 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 spinal anaesthesia. In pregnancy, the reported incidence of PDPH is 0.3% to 40%.[5] The risk factors are size of the spinal needle, its design, direction of the bevel of spinal needle, number of times the dura was punctured, age, gender, pregnancy status and occurrence of PDPH in a previous surgery.[4] Apart from all these factors, the patient’s posture during dural puncture (sitting or lateral recumbent) also influences the occurrence of PDPH.

PDPH has a characteristic feature that it arises within 72 h in 90% of patients.[4] 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.[6]

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 posture 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 lateral posture during subarachnoid blockade on the occurrence and severity of PDPH in the parturient.

METHODS

This randomised clinical trial was conducted in the department of Anaesthesiology of a medical college hospital from January 2020 to December 2020. Prior permission was obtained from the ethics committee of our institute and the study was registered in the Clinical Trials Registry-India (CTRI) (CTRI/2020/05/025120)). The subarachnoid block was administered in the sitting posture (group A) or lateral posture (group B). When the surgery was completed, the parturient was transferred to the post-anaesthesia care unit. The parturient was enquired about PDPH on postoperative days 1, 2, 3, 4 and 5. The severity was evaluated by the Numeric Rating Scale.

The incidence of PDPH and its severity were the primary outcomes and associated symptoms such as nausea, vomiting and photophobia were secondary outcomes in the study.

A sample of a total of 134 cases was required at 95% confidence and 80% power to verify the expected difference of 15.5% in the occurrence of PDPH in both groups (20.8% in the sitting posture versus 4.3% in the lateral posture).
Statistical analysis was done using Statistical Package for the Social Sciences, version 21 for Windows (SPSS inc., Chicago, IL, USA). The categorical data were presented as numbers % and compared by Chi-square test. The quantitative data were presented as mean ± standard deviation and compared by Student’s t-test (P < 0.05 as statistically significant).

RESULTS

The overall incidence of PDPH was 11.19% in our study. In group A, 17.91% and in group B, 4.48% developed PDPH. Thus, it was more in the sitting posture (P value 0.028, statistically significant).

In group A, the incidence of PDPH was 8.96%, 14.93%, 17.91% and 4.48% on postoperative days 1, 2, 3 and 4, respectively. In group B, it was 4.48% on postoperative days 1 and 2 and 1.49% on postoperative day 3. The incidence in group A was maximum on day 3 (P value 0.004) statistically significant.

In group A, out of 12 patients, 6 (50%) patients developed PDPH on postoperative day 1, 4 (33.33%) patients on day 2 and 2 (16.66%) patients on day 3. In group B, all 3 (100%) patients developed PDPH on day 1 [Table 1].

In group A, out of 12 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].

In group A, 12 (17.91%) patients had nausea and 9 (13.43%) had vomiting, while in group B, it was 3 (4.48%) and 1 (1.49%), respectively. The occurrence of nausea (P value 0.028) and vomiting (P value 0.021) were more in the sitting position.

DISCUSSION

The incidence of PDPH was more in the sitting posture in our study population (P value 0.028). Davoudi M et al.[8] also found that the incidence was more in the sitting (20.8%) than in the lateral posture (4.3%) (P = 0.017). Majd SA et al.[7] found that the incidence was significantly less in the lateral posture (16.6%) as compared to the sitting posture (45%). The meta-analysis by Zorilla-Vaca A[6] showed results similar to our study.

In our study, the incidence of PDPH in group A was maximum on day 3. Our results coincide with the results of Davoudi M et al.[8] [Table 1].

The severity of PDPH was mild to moderate in both groups. None of the patients had a severe headache. Nausea and vomiting were remarkably more in the sitting posture as compared to the lateral recumbent (P < 0.05). Similar results have been obtained by other researchers[4,9,10] [Figure 1].

After the dural puncture, the dural defect is healed by fibrosis of the nearby tissues. There are several possible mechanisms for the increased incidence of PDPH in the sitting posture. First, dural healing may be delayed because the spaces between two vertebrae are more noticeable, and hence, needle puncture is easier and less traumatic.[6] Second, the CSF pressure is more in the sitting position (40 cm H2O) than in the lateral position (5-20 cm H2O). This higher CSF pressure increases the duration of the CSF leak. Third, the spinal needle is at a 90° angle to the dural fibres, thus making a larger hole and an extended duration of CSF leakage.[4] Nevertheless, all the patients were treated with positive reassurance, bed rest, avoidance of pillow, adequate hydration, caffeine, analgesics and antiemetics.

CONCLUSION

We conclude that there is a decreased incidence and severity of PDPH when the subarachnoid block is administered in the lateral recumbent posture as

| Variable | Group A | Group B | P |
|----------|---------|---------|---|
| Incidence of PDPH on POD1 | 6 | 10 | 0.490 (NS) |
| Incidence of PDPH on POD2 | 12 | 14.93 | 4.48 | 0.080 (NS) |
| Incidence of PDPH on POD3 | 12 | 17.91 | 1 | 1.49 | 0.00 (S) |
| Incidence of PDPH on POD4 | 3 | 4.48 | 0 | 0.243 (NS) |
| Incidence of PDPH on POD5 | 0 | 0 | 0 | 0 |

PDPH: Post-dural puncture headache; POD: Postoperative day; S: Significant; NS: Not significant; n: Number

Figure 1: Difference in the severity of PDPH by Numerical Rating Scale
compared to that given in the sitting posture. Thus, it is preferable to give spinal anaesthesia in the lateral posture.

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Conflicts of interest
There are no conflicts of interest.

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