



# Incidence of Post Dural Puncture Headache in Obstetric Patients for Lower Segment Caesarean section Under Spinal Anaesthesia Using Small Gauge Spinal Needle

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## Abstract

**Background:** Post Dural puncture headache (PDPH) is one of the most distressing side effects of spinal anaesthesia with variable incidence rates depending upon the type and gauge of the needle used. The present study was undertaken to determine the incidence rate of PDPH in ASA II parturients undergoing Lower segment caesarean section (LSCS) under spinal anaesthesia using 26G spinal needles. **Methods:** Pre anaesthetic checkup of 670 study patients was done. The patients were explained the concept and procedure of this study and informed consent was obtained before the procedure. Standardized anaesthetic technique was employed for every patient after recording vitals like pulse, Noninvasive blood pressure and pulse oximetry. Intravenous line was established with 18G Cannula and patient was preloaded with 500cc of Crystalloid either Ringer lactate or 0.9% Normal saline. The Subarachnoid block was performed with 26G Quincke needle in sitting position 2.4ml of 0.5% heavy bupivacaine without adjuvant was administered. Patients were followed up for post Dural puncture headache for 5 days postoperatively. **Results:** In our study, PDPH was present in only 9 (1.34%) patients and majority of the patients needed single prick. Out of them only 2 (.36%) had PDPH whereas 7 (6.19%) with double prick had PDPH. PDPH was mild in 5 (55.6%) patients, moderate in 3 (33.3%) patients and severe in only 1 (11.1%) patient. Incidence of PDPH was less in patients with parallel orientation of bevel of needle. Few patients had Back pain followed by Nausea and vomiting and Vertigo. **Conclusion:** The incidence and severity of PDPH is quite low in the obstetric patients receiving spinal anaesthesia with 26G spinal needle, the incidence being lesser with single prick as against with double prick.

**Keywords:** Obstetric Patients, Spinal Anaesthesia, Lower Segment Caesarean Section, Post Dural Puncture Headache

## INTRODUCTION

Regional anaesthesia in the form of spinal, epidural or combined spinal epidural has always been the anaesthetist's first choice in obstetric anaesthesia because of the various

advantages conferred by it which include ease of technique, rapidity of onset, requirement of minimal equipment's and monitors, subtle effects on blood biochemistry, optimal arterial blood gases (ABG), conscious patients during



surgery, maintenance of airway patency and provision of intense analgesia.<sup>[1]</sup> However, regional anaesthesia has certain complications, postdural puncture headache (PDPH) being especially more in post caesarean young parturients.<sup>[2]</sup> Previously less refined thicker needles were used resulting in higher incidence of PDPH to the tune of 30%.<sup>[3]</sup> With the advent of refined and finer needles in the recent years (25-31 G) there has been a dramatic decline in the incidence rates of PDPH as much as 0-5%.<sup>[4]</sup> PDPH can occur following uncomplicated spinal anaesthesia as well as a result of accidental dural puncture at the time of epidural insertion. The International Headache Society has defined PDPH as a bilateral headache that develops within seven days after lumbar puncture and disappears within 14 days.<sup>[5]</sup> This headache has been described to worsen within 30 minutes of assuming the upright position with significant improvement within 30 minutes of resuming the recumbent position. PDPH can be immensely debilitating to the patient and may be associated with symptoms of neck stiffness, nausea and vomiting, tinnitus, photophobia, backache and diplopia. Cerebrospinal fluid (CSF) leakage together with compensatory dilatation of cerebral veins, increased brain volume and traction to pain sensitive structures within the cranium secondary to loss of CSF have been postulated as possible mechanisms of PDPH in spinal anaesthesia.<sup>[6]</sup> However pencil point tip spinal needles and those of finer gauge are associated with lower incidence of PDPH.<sup>[7]</sup> The overall incidence of PDPH ranges from 0.1% - 36% depending upon the type and gauge of needle used.<sup>[8]</sup> The present study was undertaken to calculate the incidence of PDPH in obstetric patients

undergoing lower segment caesarean section (LSCS) using 26 G Quinckes type point needle.

### **MATERIALS AND METHODS**

The present study was conducted in the department of Anaesthesiology in a tertiary care hospital from October 2019 to February 2020. The study included obstetric patients ASA II, 20-40 years who were planned for LSCS under spinal anaesthesia. ASA III and IV patients, patient refusal, increased Intracranial pressure, bleeding disorders, hypotension, patients with history of chronic headache such as migraine, cluster headache and tension headache were all excluded from the study. Pre-anaesthetic visit of all the patients was done. The patients were explained the concept and procedure of this study and informed consent was obtained before the procedure.

Standardized anaesthetic technique was employed for every patient after recording vitals like pulse, NIBP and SpO<sub>2</sub>. Intravenous line was established with 18G cannula and patient was preloaded with 500cc of crystalloid either Ringer Lactate or 0.9% Normal Saline. The Subarachnoid block was performed by 26G Quincke's needle in sitting position. After successful attempt and obtaining free flow of clear CSF 2.4 ml of 0.5% heavy bupivacaine without adjuvant was administered.

Number of attempts of dural puncture, level of puncture, vital signs (Heart rate, non-invasive blood pressure and pulse oximetry SpO<sub>2</sub>) were noticed before the block and after till the entire duration of surgery. Patients were followed up for post dural puncture headache (PDPH) for 5 days postoperatively. PDPH was considered if headache was located in frontal / occipital area, increasing with standing or sitting position and decreasing on lying flat. Severity of PDPH was defined as mild, moderate and



severe with correlation to VAS (VAS 0-10) scores wherein 0 = No headache, 1-3 = mild headache, 4-7 moderate headache and 8-10 = severe headache.

All patients experiencing headache were treated by advising them to lie down flat, drink plenty of fluids and coffee, decrease activity and take 500mg of Paracetamol, one or two tablets every 8 hourly. None of the patient required autologous epidural blood patch.

Grading of Post Dural Puncture Headache (PDPH) was done as 0- No headache.

1- Mild PDPH (VAS score 1-3) slight restriction of daily activities. Patient is not bedridden and no associated symptoms.

2- Moderate PDPH (VAS score 4-7) significant restriction of daily activities. Patient is bedridden part of the day. Associated symptoms may or may not be present.

3- Severe PDPH (VAS score 8-10) incapacitating headache, Impossible to sit up. Associated symptoms were always present.

A follow up of the patients was done of a daily basis up to a period of 5 days post operatively.

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar diagrams and line diagrams. Chi-square was employed for comparing incidence of PDPH with respect to age, number of pricks and orientation of bevel of needle. A P-value of less than 0.05 was considered statistically significant. All P-values were two tailed.

## RESULTS

**Table 1:** Age Distribution of Study Population

Age (In Years)	Frequency	Percentage
20-23	180	26.9
24-27	154	23.0
28-31	165	24.6
32-35	171	25.5
TOTAL	670	100
MEAN± SD (RANGE)= 27.5± 4.72		

**Table 2:** Incidence of PDPH

Pdph	Frequency	Percentage
PRESENT	90	1.34
ABSENT	661	98.66
TOTAL	670	100



**Table 3:** Distribution of Study Population According To Number of Pricks

No. Of Pricks	Frequency	Percentage
SINGLE PRICK	557	83.13
DOUBLE PRICK	113	16.87
TOTAL	670	100

**Table 4:** Incidence of PDPH According To Age (In Yrs.)

Age (In Years)	N	PDPH No. (%)
20-23	180	1(0.56%)
24-27	154	4 (2.60%)
28-31	165	3 (1.82%)
32-35	171	1 (0.58%)
TOTAL	670	9 (1.34%)
CHI SQUARE= 3.694 P= 0.297		

**Table 5:** Incidence of PDPH According To Number of Pricks in Study Population

Number of Pricks	N	PDPH No. (%)
Single Prick	557	2 (0.36%)
Double Prick	113	7 (6.19%)
Total	670	9 (1.34%)
CHI-SQUARE 19.937 P< 0.001*		

**Table 6:** Severity Grading of Patients with PDPH

Severity Grading	Frequency	Percentage
Mild	5	55.6
Moderate	3	33.3
Severe	1	11.1
Total	9	100

**Table 7:** Incidence of PDPH According To Orientation of Bevel Needle in Study Population

Orient Of Bevel Of Needle	N	PDPH No. (%)
Parallel	450	1 (0.22%)
Perpendicular	107	1 (0.93%)
Total	557	2 (0.36%)
Chi-Square= 0.043 P= 0.835		

**Table 8:** Associated Symptoms in Patients with PDPH

Associated Symptoms	Frequency	Percentage
Nausea	4	44.4
Vomiting	3	33.3
Vertigo	3	33.3
Back Pain	7	77.8



Blurred Vision	0	0.0
Neck Stiffness	0	0.0

Out of a total of 670 study patients, 180 (26.9%) were 20-23 years old, followed by 171 (25.5%) patients who belonged to 32-35 years of age. 165 (24.6%) patients were aged 28-31 years whereas 154 (23%) patients aged 24-27 years. Mean age of our study patients was 27.5 years.(TABLE 1)

In our study, PDPH was present in only 9 (1.34%) patients. (TABLE 2)

Majority of patients needed single prick i.e. 557 (83.13%) whereas 113 (16.87%) patients had double prick. (TABLE 3)

Out of 180 patients aged 20-23 years only 1 (0.56%) had PDPH, 4(2.6%) of 154 patients had PDPH aged 24-27 years. There were 165 patients aged 28-31 years and among them 3 (1.82%) had PDPH. Only 1(0.58%) of 171 patients aged 32-35 years had PDPH. (TABLE 4)

Out of 557 patients who needed single prick only 2 patients (0.36%) had PDPH whereas 7 patients (6.19%) out of the 113 patients with double prick had PDPH. The difference observed was statistically significant with p value of less than 0.001. (TABLE 5)

Grading of severity was mild in 5 (55.6%) patients in our study followed by moderate severity in 3 (33.3%) patients and only 1 (11.1%) patient had severe grading of PDPH. (TABLE 6)

Incidence of PDPH according to orientation of bevel of needle was observed in our study and 450 patients were found to have parallel orientation of bevel of needle and among them only 1 (0.22%) patient had PDPH, whereas of the 107 patients with perpendicular orientation of bevel of needle 2 (0.36%) had PDPH. The

difference observed was statistically insignificant with p value of 0.835. (TABLE 7) When associated symptoms were observed in our study patients, back pain was seen in 7 (77.8%) patients followed by nausea in 4 (44.4%) patients whereas vomiting and vertigo was observed in 3 (33.3%) patients each. (TABLE 8)

## DISCUSSION

PDPH is one of the most debilitating complications resulting from spinal anaesthesia as also inadvertent dural puncture at the time of epidural insertion. However, with the advent of finer, narrow gauge needles, the incidence of PDPH has declined dramatically.

The present study included 670 parturients (ASA II), undergoing LSCS under subarachnoid block using 26G spinal Quinckes needle, the mean age of the patients being 27.54 years.

The overall incidence of PDPH in our study was 1.34%. In a study done by Dagmar Oberhofer et al using 26G and 27G Quinckes needle, the incidence of PDPH was 14.3% in orthopaedic patients and 13.6% in obstetric patients.<sup>[8]</sup> However, lower incidence rates in concordance to our study have also been reported by Myers et al and Hwang et al.<sup>[9,10]</sup> A number of factors predispose a parturient to enhanced incidence of PDPH eg. elevated CSF pressures, dehydration due to fasting status and effects due to increased oestrogen levels as well as peridural pressures attributing to incidence rates between 0-30%.<sup>[11,12]</sup>

The incidence of PDPH was 0.56% in 20-23 years age group, 2.6%, 1.82% and 0.58% in 24-27 years, 28-31 years and 32-35 years age group respectively. Other studies have also reported increased incidence of PDPH in the 20-30 age groups.<sup>[11,13]</sup>

The incidence with single prick was 0.36% and 6.19% with double prick the difference being statistically significant. It has been well documented in literature that a second puncture elevates the risk of PDPH.<sup>[14]</sup>

Incidence of PDPH according to orientation of bevel of needle was observed in our study and 450 patients were found to have parallel orientation of bevel of needle and among them only 1 (0.22%) patient had PDPH, whereas of the 107 patients with perpendicular orientation of bevel of needle 2 (0.36%) had PDPH. The difference observed was statistically insignificant with p value of 0.835. Though certain studies have shown that a perpendicular orientation of the bevel results in lower incidence rates but it is debatable.<sup>[15]</sup> In our study no such association was found.

The severity of PDPH was mild in 55.61% patients whereas it was severe in 1 patient (11.11%) albeit all were managed

conservatively (bed rest, fluids and paracetamol) without the need of autologous epidural blood patch. Our results are consistent with Flaatten et al.<sup>[16]</sup>

When associated symptoms were observed in our study patients, back pain was seen in 7 (77.8%) patients followed by nausea in 4 (44.4%) patients whereas vomiting and vertigo was observed in 3 (33.3%) patients each. Nausea, vomiting, backaches, vertigo, diplopia, tinnitus are some of the associated symptoms with PDPH and have been well described in literature.<sup>[17,18,19]</sup>

## CONCLUSION

From this study it can be concluded that the incidence of PDPH is very small with the use of 26G spinal needles in obstetric patients. However with an increase in number of pricks the incidence of PDPH is also amplified. Also the severity of PDPH with 26 Gauge needles is mild which can be managed conservatively without the need of invasive measures like autologous epidural blood patch.

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