

## Incidence of PDPH following spinal anesthesia in obstetric patients undergoing cesarean section in our setup

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### Abstract

**Background:** Post dural puncture headache has remained a well-known complication of spinal anaesthesia. The potentially serious nature of this complication necessitates inclusion of informed consent involving any procedure that may result in post dural puncture headache. **Aim:** To determine the overall incidence of post dural puncture headache in obstetric patients in our set up and determine the onset, duration and severity of postdural puncture headache. **Methods:** This prospective, observational study was conducted in Postgraduate Department of Anaesthesiology, Critical Care and was done in Lalla Ded Hospital, an associated hospital of Government Medical College, Srinagar on patients who underwent cesarean section under spinal anaesthesia for incidence, onset, duration and severity of postdural puncture headache. **Results:** Incidence of post dural puncture headache was 10.6% (102 of 960) in our study patients, mean time of onset of post dural puncture headache was 26.4+8.92 hours, severity of PDPH was mild in 62 (60.8%) patients, moderate in 39 (38.2%) patients and severe in 1 (1.0%) of the patients. The mean duration of PDPH was 5.3+2.89 days. **Conclusion:** To prevent PDPH, the use of size 26 gauge quincke's needles may be encouraged as this study has shown but cost consideration especially in the developing countries setting is always a limiting factor. Conservative measures as treatment for PDPH, should be tried first in view of the good response obtained for all the cases of PDPH in this study.

**Keywords:** Postdural puncture headache (PDPH), Spinal anaesthesia, Needle size, Prevention

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### Introduction

Although modern anesthesiology has made great progress in the last decades, neuraxial anesthesia (NA) is still the keynote of regional blockade[1]. Neuraxial anesthesia is popular for its effectiveness in producing anesthesia for providing excellent intra-operative neuromuscular paralysis and in generating analgesia for relieving postoperative pain, if continuously infused[2]. As the NA techniques are used popularly in clinic, post dural puncture headache (PDPH), a common iatrogenic complication resulting from post-spinal taps or accidental dural puncture (ADP) subsequent to epidural block, is frequently reported[3] and becomes a challenge to health caregivers. PDPH is believed to originate from persistent leakage of cerebrospinal fluid (CSF) greater than the cerebrospinal fluid production after lumbar puncture[4]. According to the diagnostic criteria of International Headache Society (IHS) in 2004, the PDPH can appear up to the fifth day after lumbar puncture and disappears spontaneously within a week, or up to 48 hours after an epidural blood patch (EBP). In addition, it is accompanied by neck stiffness, tinnitus, hypoacusia (partial loss of hearing), photophobia, and nausea[5].

Certain factors that may affect the incidence of PDPH include age, gender, pregnancy, history of PDPH, shape of spinal needle tip, size of needle, needle bevel orientation to dural fibers, midline vs lateral lumbar puncture (LP) approach, number of LPs, and clinical experience of the operator[6-8].

Although, continuous spinal technique and timing of patient's ambulation does not increase the incidence of PDPH[9] but some data indicate that early ambulation may actually decrease its incidence[10,11].

### Methods

This study was conducted in Postgraduate Department of Anaesthesiology, Critical Care and Pain Management in Government Medical College, Srinagar over a period of 18 months after obtaining ethical clearance from Institutional Ethical Committee. This study was a Prospective Observational study where patients undergoing cesarean section was studied for the incidence, onset, duration and severity of postdural puncture headache.

### Study Design

A prospective observational study.

### Study Setting

Lalla Ded Hospital of GMC Srinagar Kashmir.

### Study Duration

18 months

### Study Sample

Free sample

After obtaining informed and written consent patients were included in the study. Detailed history of present and past medical illness was obtained. Baseline investigations and general physical examination including spine and general airway assessment was done.

In pre-operative area intravenous line was secured with 18G cannula and ringer lactate or 0.9% normal saline 10ml/kg body weight was

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started, injection Pantop 40mg i/v and injection metoclopramide 10mg i/v given as premedication. After arrival in the operating room multi-channel monitor was attached and preoperative vitals heart rate, blood pressure and saturation were recorded. After cleaning the area of appropriate space with aseptic solution, lumbar spine was identified. The anaesthetist was free to choose the needle size and approach for the spinal anaesthesia. Block was given in sitting / lateral position, with quincke's needle bevel directed parallel to the axis of spine. Local anaesthesia with injection 2% lignocaine was injected in skin at L4-5 or L3-4. Subarachnoid space was identified by free flow of CSF and injection bupivacaine 0.5% heavy 10-12.5mg was injected through it. The patient then was laid down in supine position with a wedge under right hip to avoid aortocaval compression. Level of sensory and motor block was confirmed by swab test and bromage score. Intraoperative vital monitoring was done and complications like hypotension, bradycardia, vomiting was managed according to the hospital protocol. After completion of the surgery the anaesthetist visited to the patient after 6hrs then 12, 24 and 48 hours thereafter. If the patient is discharged from the hospital the anaesthetist enquired about headache telephonically on 5th and 7th day and continue to do so till headache subsides. Patients were allowed to ambulate after 6 hours of surgery. In follow up visits, patients were asked about the

onset, duration, severity, associated symptoms like nausea, vomiting, neck rigidity, aggravating and relieving factors, history of fever with headache. Vital signs, sensory and motor regression were monitored. Look for the signs and symptoms of cranial nerve weakness. Hypoglycemia, dehydration and anxiety should be ruled out.

#### Statistical Methods

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). Statistical software SPSS (version 20.0) and Microsoft Excel were used to carry out the statistical analysis of data. Continuous variables were expressed as Mean±SD and categorical variables were summarized as percentages. Chi-square test or Fisher's exact test, whichever appropriate, was used for comparison of categorical variables. Graphically the data was presented by bar and pie diagrams. A P-value of less than 0.05 was considered statistically significant. All P-values were two tailed.

#### Results

In our study majority of patients i.e. 363 (37.8%) aged between 25-29 years followed by 275 (28.6%) who were aged between 30-34 years. There were 196 (20.4%) patients who belonged to age group of 20-24 years while as >35 was the age of 126 (13.1%) patients. The mean age in our study was 27.5±9.26 years (Table 1).

**Table 1: Age distribution of study population**

Age (years)	No. of patients	Percentage
20-24	196	20.4%
25-29	363	37.8%
30-34	275	28.6%
≥35	126	13.1%
Total	960	100%
Mean ±SD=27.5±9.26		

Onset of post dural puncture headache was within 24 hours in 48 (47.1%) patients followed by 24-48 hours in 42 (41.2%) patients, 48-72 hours in 12 (11.8%) patients. Mean time of onset of post dural puncture headache was 26.4±8.92 hours (Table 2).

**Table 2: Onset of PDPH in study patients**

Onset of PDPH (hours)	No. of patients	Percentage
Within 24 hours	48	47.1%
24-48 hours	42	41.2%
48-72 hours	12	11.8%
≥72 hours	0	0.00%
Total	102	100%
Mean ±SD=26.4±8.92		

Out of 102 study patients, severity of PDPH was mild in 62 (60.8%) patients, moderate in 39 (38.2%) patients and severe in 1 (1.0%) of the patients (Table 3).

**Table 3: Severity grading of patients with PDPH**

Severity Grading	No. of patients	Percentage
Mild	62	60.8%
Moderate	39	38.2%
Severe	1	1.0%
Total	102	100%

Duration of post dural puncture headache was 4-7 days in majority of patients i.e. 62 (60.8%) followed by 1-3 days in 21 (20.6%), 8-10 days in 16 (15.7%) patients while as only 3 (2.9%) patient had post dural puncture headache for >10 days. The mean duration of PDPH was 5.3±2.89 days (Fig 1).

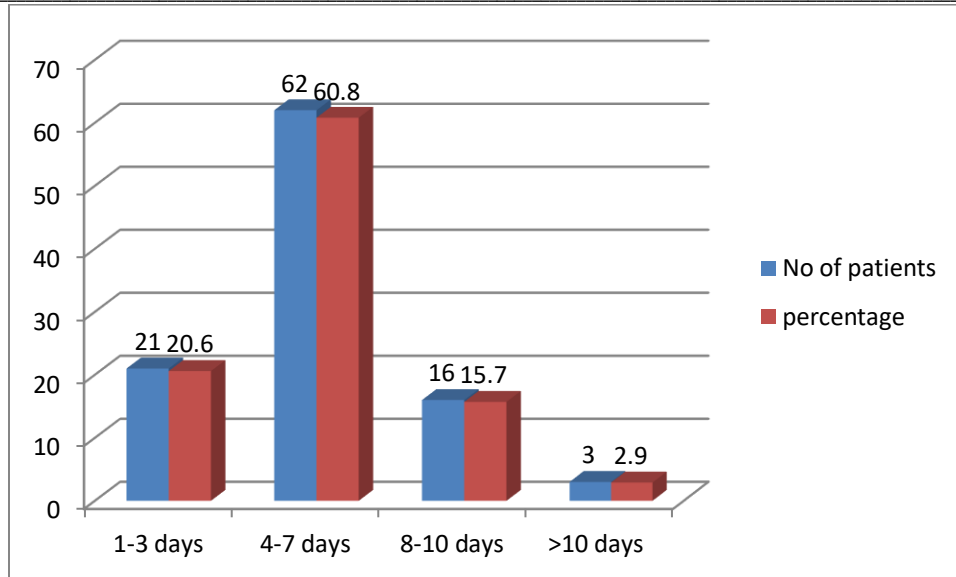


Fig1: Duration of post dural puncture headache

Out of a total of 960 patients 590 patients received spinal anaesthesia with 25 gauge needle of which 96 (16.3%) developed PDPH, rest 370 patients received spinal anaesthesia with 26 gauge of which 6 (1.6%) developed PDPH. The difference was statistically significant when incidence of PDPH was observed as per size of needle ( $p < 0.001$ ) (Fig 2).

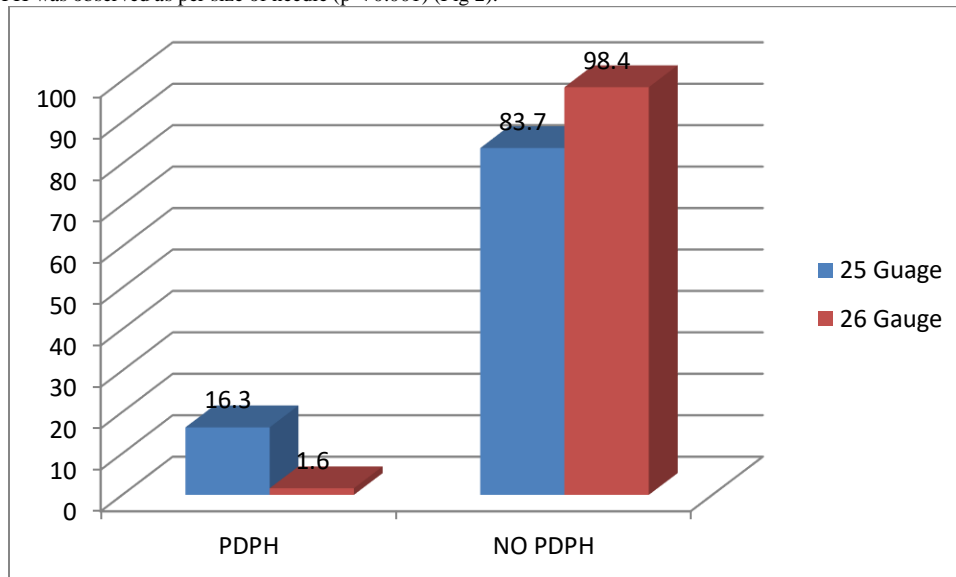


Fig2: Size of needle

**Discussion**

Post dural puncture headache is defined as “a positional headache arising within 7 days of a dural puncture that becomes worse when standing and is relieved on lying down”[12]. The suggested theories behind the occurrence of PDPH are leakage of CSF both at the time of dural puncture and leakage of CSF afterwards[13]. This causes low CSF pressure causing meningeal vasodilation, in addition to mechanical traction on cranial nerves and other pain-sensitive structures when in the upright position[14-16]. The various risk factors for PDPH have been cited in many literatures. Most important are age[17], Sex[18], type of needles[19], size of needles[20]. In our study majority of patients i.e. 363 (37.8%) aged between 25-29 years followed by 275 (28.6%) who were aged between 30-34 years. There were 196 (20.4%) patients who belonged to age group of 20-24 years

while as >35 was the age of 126 (13.1%) patients. The mean age in our study was 27.5±9.26 years.

**Malarvizhi AC and Sree RS (2016)[21]** conducted a study in which majority of the patients were between 21-29 years in both the groups (73.3%). The mean age in both groups was similar (G1=24.3 years, G2 = 23.8 years). **Shah A et al (2002)[22]** conducted a study in which mean age at presentation was 23.6 years. Similar observation was found by **Ayub F et al (2017)[23]**, in their study the mean age at presentation was 27.77 ±4.82 years.

In our study, there were 401 (41.8%) gravida 2, 237 (24.7%) were gravida 3, 219 (22.8%) were gravida 1, and 103 (10.7%) of the study participants were gravida 4 with a mean gravidity of 2.3±1.41. **Paul UM (2004)[24]** in his dissertation observed mean gravidity in Group I (25G Quincke’s) was 3.18(SD±1.59), and in Group 2 (25 G Whitecare) was 2.85(SD±1.58).

In our study, incidence of post dural puncture headache was 10.6% (102 of 960). **Malarvizhi AC and Sree RS (2016)[21]** conducted a study on 120 patients wherein 14 patients had PDPH (G1=3, G2= 11). The overall incidence of PDPH in their study was 5% in study group (G1= 3) and 18.3% in control group (G2= 11). **Shah A et al (2002)[22]** conducted a study in which the overall incidence of PDPH was 20%. **Ayub F et al (2017)[23]** also confirmed incidence of PDPH in their study was 14.5%. Studies conducted earlier showed the incidence of PDPH with quincke needles as 36% (22G), 3-25% (25G), 0.3-20% (26G), 1.5-5.6% (27G).<sup>52,53,54</sup> The overall incidence of distressing post spinal headache has varied from 0 % to 37.2 %, as reported by various authors<sup>55,56</sup>. In our study, onset of post dural puncture headache was within 24 hours in 48 (47.1%) patients followed by 24-48 hours in 42 (41.2%) patients, 48-72 hours in 12 (11.8%) of the patients. Mean onset of post dural puncture headache was 26.4+8.92 hours. **Malarvizhi AC and Sree RS (2016)[21]** conducted a study in which the duration of PDPH was less than 24 hours in 12 patients and less than 48 hours in two patients. The mean duration of headache was 27.42 hours. None of the patients had headache more than 48 hours. In a study by **Lynch J et al (1991)[25]** the mean duration of headache was 48 hours (range 24 – 64 hours) and 57.5 hours (range 8-80 hours) in 25 and 22 gauge groups respectively which is also consistent with the findings of **Lybecker H et al. (1990)[14]**. **Shah A et al (2002)[22]** conducted a study in which mean onset of post dural puncture headache was 27.7 hours. **Samuel M (2009)[26]** in their study found that onset of headache occurred in 84.5% of the patients in the first day, 12.1% of patients on the second day and 1.7% on the third day after dural puncture. In our study, severity grading was mild in 60.8% patients, moderate in 38.2% patients and severe in 1.0% of the patients. In a study conducted by **Brownridge P in 1984[27]** the severity of PDPH was graded as mild in 8%, moderate in 3% and severe in 2.3%.

In our study, duration of post dural puncture headache was 4-7 days in majority of patients i.e. 62 (60.8%) followed by 1-3 days in 21 (20.6%), 8-10 days in 16 (15.7%) patients while as only 3 (2.9%) patient had post dural puncture headache for >10 days. The mean duration of PDPH was 5.3+2.89 days. **Shah A et al (2002)[22]** confirmed that mean duration of headache was 48 hours (range of 24-64 hours). **Ali HM et al (2014)[28]** conducted a study in which 624 (32.58%) cases developed PDPH in G22, while 234 (32.86%) cases developed PDPH in G20, with the VAS ranging from 3–5 (mild to moderate) starting in the second day and disappearing in the fifth day. In our study, mothers who underwent spinal anesthesia with 25 G needle were more likely to develop PDPH as compared to mothers who had spinal anaesthesia with 26 G spinal needle (16.3% versus 1.6%). Out of a total of 960 patients 590 patients received spinal anaesthesia with 25 G needle of which 96 (16.3%) developed PDPH, rest 370 patients received spinal anaesthesia with 26 G of which 6 (1.6%) developed PDPH. The difference was statistically significant when incidence of PDPH was observed as per size of needle (p < 0.001). In a study done by **Ghanei MM and Mehraban MS (2015)[29]**, the groups suffering from headache most, were the 27 G (34.3%) and the 26 G group (33.8%) compared to the 25 G group (29.9%).

### Conclusion

In our study, we have observed that incidence of PDPH in patients admitted in Lalla Ded Hospital Srinagar for caesarean section under spinal anaesthesia is 10.6%, the mean duration of onset was 26.4 hours, mean duration of PDPH was 5.3 days and the severity of headache experienced by the patients was of mild grade.

To prevent PDPH, the use of size 26 gauge quincke's needles may be encouraged as this study has shown but cost consideration especially in the developing countries setting is always a limiting factor.

Conservative measures as treatment for PDPH, should be tried first in view of the good response obtained for all the cases of PDPH in this study.

The presence of PDPH did affect patient's satisfaction and future acceptance of spinal anaesthesia in this study. Patients who declined

acceptance of spinal anaesthesia in the future made that decision on account of inadequate analgesia, so effort should be made to commence adequate postoperative analgesia early.

### Conflict of interest

Nil

### Funding

Nil

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