

## ORIGINAL RESEARCH

### Assessment of post dural puncture headache using various sizes of spinal needles

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#### ABSTRACT

**Background:** Postdural puncture headache (PDPH) is defined as a headache occurring within 5 days after lumbar puncture (LP). The present study assessed post dural puncture headache using various sizes of spinal needles.

**Materials & Methods:** 90 patients who were planned to undergo lower limb or lower abdomen surgery under spinal anesthesia of American Society of Anesthesiologists Physical Status I and II were divided into three groups, Group I, II, and III having a lumbar puncture was made in the L3-L4 interspace using Quinckes spinal needle of size 23 gauge, 25 gauge, and 26 gauge, respectively. Patients complaining of the headache and satisfying the criteria for PDPH as laid out by International Society of Headache were diagnosed to have PDPH. The severity of the headache was assessed using Cocker's scale.

**Results:** Group I had 17 males and 13 females, group II had 12 males and 18 females and group III had 15 males and 15 females. The incidence of PDPH was seen in 6, 4 and 1, onset was 2nd day seen in 1, 1 and 0, 4th day was seen in 2, 1 and 0 and 5th day seen in 3, 2 and 1. Location was frontal seen in 4, 1 and 1, generalized seen in 2, 1 and 0. Severity was mild seen in 6, 3 and 1. Duration was <24 hours seen in 4, 2 and 1, 24-48 hours seen in 2, 1 and 0. The difference was significant ( $P < 0.05$ ).

**Conclusion:** The incidence of PDPH was found to be minimum with 26 G Quincke needle.

**Key words:** Postdural puncture headache, needle, lower limb

#### Introduction

Postdural puncture headache (PDPH) is defined as a headache occurring within 5 days after lumbar puncture (LP), which is aggravated when standing or sitting and relieved when lying flat. Associated symptoms include stiff neck, hearing loss, tinnitus, photophobia, hyperacusia, and nausea. The prevalence of PDPH is higher in pregnant women.<sup>1</sup> It is a common complication of lumbar puncture, which is likely due to the loss of cerebrospinal fluid (CSF) into the epidural space through the dural tear. The reported incidence of PDPH varies from 10 to 40% depending on age, gender, and needle size. The first recorded incidence of PDPH was by Augustus Bier on his first ever demonstration of spinal anesthesia using cocaine. Even after a century of practicing spinal anesthesia there has been a less advance in methods for completely preventing the occurrence of PDPH.<sup>2</sup>

There are multiple factors that may lead to a headache following spinal anesthesia, hence before diagnosing PDPH it is mandatory to rule out other causes of the headache.<sup>3</sup> Spinal needles generally used today are 22 to 27 G, but sizes ranging from 18 to 30 G are available.<sup>4</sup> The incidence of PDPH after spinal anesthesia performed with Quincke, cutting needle, is 36% with 22 -G needle, 25% with 25-G needle, 2 to 12% with 26- G needle, and less than 2% for smaller than 26-G needles.<sup>5,6</sup> The present study assessed post dural puncture headache using various sizes of spinal needles.

## Materials & Methods

This study consisted of 90 patients who were planned to undergo lower limb or lower abdomen surgery under spinal anesthesia of American Society of Anesthesiologists Physical Status I and II.

Demographic data of patients was recorded. Patients were divided into three groups, Group I, II, and III having a lumbar puncture was made in the L3-L4 interspace using Quinckes spinal needle of size 23 gauge, 25 gauge, and 26 gauge, respectively. All patients were uniformly preloaded with intravenous ringer lactate 10 ml/kg and positioned in sitting position for lumbar puncture. In all the study, subjects uniformly 0.5 ml of cerebrospinal fluid (CSF) was allowed to spill out before injecting the local anesthetic. Patients complaining of the headache and satisfying the criteria for PDPH as laid out by International Society of Headache were diagnosed to have PDPH. The severity of the headache was assessed using Cocker's scale. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## Results

**Table I Distribution of patients**

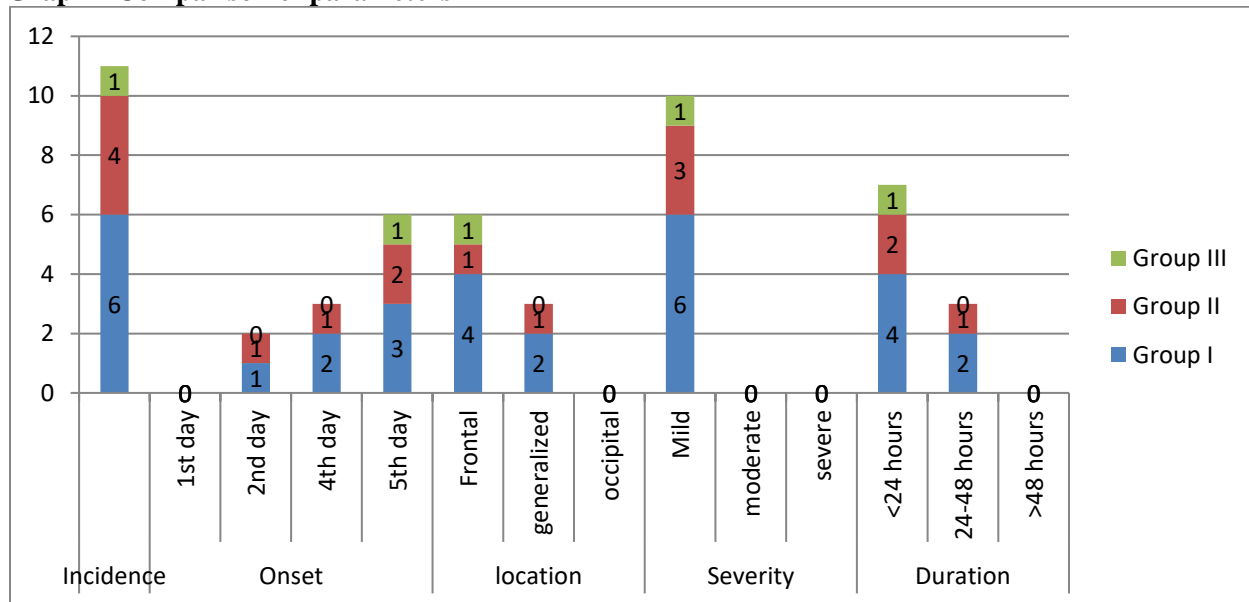
Groups	Group I	Group II	Group III
Status	23 gauge	25 gauge	26 gauge
M:F	17:13	12:18	15:15

Table I shows that group I had 17 males and 13 females, group II had 12 males and 18 females and group III had 15 males and 15 females.

**Table II Comparison of parameters**

Parameters	Variables	Group I	Group II	Group III	P value
Incidence		6	4	1	0.02
Onset	1 <sup>st</sup> day	0	0	0	0.01
	2 <sup>nd</sup> day	1	1	0	
	4 <sup>th</sup> day	2	1	0	
	5 <sup>th</sup> day	3	2	1	
location	Frontal	4	1	1	0.03
	generalized	2	1	0	
	occipital	0	0	0	
Severity	Mild	6	3	1	0.01
	moderate	0	0	0	
	severe	0	0	0	
Duration	<24 hours	4	2	1	0.02
	24-48 hours	2	1	0	
	>48 hours	0	0	0	

Table III shows that incidence of PDPH was seen in 6, 4 and 1, onset was 2nd day seen in 1, 1 and 0, 4th day was seen in 2, 1 and 0 and 5th day seen in 3, 2 and 1. Location was frontal seen in 4, 1 and 1, generalized seen in 2, 1 and 0. Severity was mild seen in 6, 3 and 1. Duration was <24 hours seen in 4, 2 and 1, 24-48 hours seen in 2, 1 and 0. The difference was significant ( $P < 0.05$ ).

**Graph I Comparison of parameters**

## Discussion

Several factors contribute to the development of headache after lumbar puncture, including needle size, needle design, direction of the bevel, and number of LP attempts.<sup>7</sup> Namely, using smaller diameter and non-cutting (atraumatic) needles is correlated with a lower incidence of headache after LP. Additionally, insertion of the needle with the bevel parallel to the dural fibers facilitates closure of the hole and minimizes cerebrospinal fluid leakage.<sup>8,9</sup> Modifiable risk factors of PDPH include needle size, needle shape, bevel orientation and insertion angle, stylet replacement, and operator experience. Needle size might be the most significant factor in the development of PDPH.<sup>10,11</sup> The present study assessed post dural puncture headache using various sizes of spinal needles.

We found that group I had 17 males and 13 females, group II had 12 males and 18 females and group III had 15 males and 15 females. Babu et al<sup>12</sup> evaluated the incidence of PDPH following spinal anesthesia in the south Indian population using various gauges of Quinckes spinal needle. Materials and Methods: A total of 75 American Society of Anesthesiologists I-II patients undergoing lower limb or lower abdomen surgery under spinal anesthesia were randomized into three groups each consisting of 25 patients. Patients belonging to Group I, Group II, and Group III received spinal anesthesia using 23 gauge, 25 gauge, and 26 gauge Quinckes spinal needle, respectively. Moreover, all the patients were followed up post-operatively for 5 days and evaluated for PDPH. The incidence of PDPH in the present study was 20% in Group I, 12.5% in Group II, and 4.5% in Group III, which was statistically insignificant. Conclusion: In the present study for PDPH using three different gauge Quincke spinal needles, the incidence was found to be minimum with 26 G Quincke needle.

We found that the incidence of PDPH was seen in 6, 4 and 1, onset was 2nd day seen in 1, 1 and 0, 4th day was seen in 2, 1 and 0 and 5th day seen in 3, 2 and 1. Location was frontal seen in 4, 1 and 1, generalized seen in 2, 1 and 0. Severity was mild seen in 6, 3 and 1. Duration was <24 hours seen in 4, 2 and 1, 24-48 hours seen in 2, 1 and 0. Weji et al<sup>13</sup> assessed the incidence and risk of postdural puncture headache. One hundred fifty eligible study participants were included in our study, of which 28.7% had developed postdural puncture headache. This study found that needle size, number of cerebrospinal fluid drops, and multiple attempts were significant independent predictors of postdural puncture headache. In addition, twentyfive needles were identified as the strongest preoperative independent predictor of postdural puncture headache. A recent study revealed that a small spinal needle was much better than a large cutting spinal needle regarding the frequency of postdural puncture headache. In addition, frequent attempts during lumbar puncture and increased cerebrospinal fluid leakage were associated with the

events. PDPH is due to loss of CSF through the dural hole. Increase in blood volume by means of hydration facilitates choroid plexus to produce more CSF. Therefore, increasing the production of CSF will neutralize the loss due to leakage and when the balance is maintained, there should be no post-spinal headache. All the patients were hydrated in a similar manner.

### Conclusion

Authors found that the incidence of PDPH was found to be minimum with 26 G Quincke needle.

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