



ISSN: 2091-2749 (Print)
2091-2757 (Online)

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Incidence of post dural puncture headache in parturients following early ambulation and recumbency

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ABSTRACT

Introductions: Spinal anesthesia is a safe and acceptable technique for patients undergoing caesarean section because it provides both excellent analgesia and muscle relaxation. Post Dural Puncture Headache (PDPH) is frequently reported complication after spinal anesthesia. This study evaluates the incidence of PDPH following early mobilization and recumbency after caesarean section.

Methods: This prospective, randomized comparative interventional study included 100 parturients women of age 18 to 45 years, ASA I and II, randomly divided into two groups – Ambulatory 'A' and Recumbent 'R'. At the end of caesarean section, patients were advised to either lie in recumbent position for 24 hours or mobilize as soon as they become ambulatory after spinal anesthesia. Occurrence of headache were recorded at 24 hours, 72 hours and 7th day. Software SPSS 16, chi-square test was used for proportions like incidence and severity of PDPH; $p < 0.05$ was taken as significant.

Results: The incidence of PDPH was statistically not different ($p = 0.361$) in Group R 8% (4 patients) and in Group A 6% (3 patients). In both the groups, the severity of headache was mild to moderate with only mild headaches in the Group A ($p = 0.549$).

Conclusions: Early ambulation following spinal anesthesia for caesarean section did not increase the incidence of PDPH in parturients.

Keywords: ambulation, post dural puncture headache, parturient, recumbency, spinal anesthesia

INTRODUCTIONS

Spinal anesthesia, also known as subarachnoid block, is a safe and acceptable technique. It provides excellent analgesia and muscle relaxation, is easy to perform, requires minimum apparatus, minimal effect on blood biochemistry, ensures optimum level of arterial blood gases, patient remains conscious and maintains airway, requires minimal post-operative analgesia and systemic effects of the drugs is minimal.¹

Post Dural Puncture Headache (PDPH), since first described by August Bier in 1898, is frequently reported complication of spinal anesthesia.² The incidence of PDPH was 66% in 1898³ possibly due to use of large gauge, medium bevel, cutting spinal needles. By 1956, it decreased to 11% with the use of 22G and 24G spinal needles⁴ and fine gauge Quincke's needles has further reduced it to 3-5%.

Role of post-operative recumbency to reduce the risk of PDPH remains controversial. This study compares the PDPH under controlled conditions using thin needles (26 Gauge Quincke) following early mobilization and recumbency after Caesarean section.

METHODS

After obtaining Institutional Ethical Committee approval and informed written consent from each patient, a prospective randomized comparative interventional study was conducted. This study included 100 parturients of ASA grade I and II aged 18 to 45 requiring elective Caesarian section. They were randomly allocated into two groups (Ambulatory 'A' and Recumbent group 'R') using lottery method. Patients with contraindication to spinal anesthesia, fetal distress and Severe Pre-eclampsia / Eclampsia, more than two puncture attempts, history of migraine headache or previous PDPH, history of chronic low back pain or allergy to study drugs and history of regular use of oral opioids or NSAID were excluded. The study was conducted at Paropakar Maternity Hospital, Thapathali, Kathmandu from July to

November, 2012. The patients were kept nil per orally from midnight. Premedication with Inj. Metoclopramide 10 mg and Ranitidine 50 mg were given prior to operation. On arrival to the operating room, the patient was cannulated with 18G cannula into the forearm vein. Non-invasive monitors like blood pressure, pulse oximeter and electrocardiograph were attached. Lactated Ringer's 10 ml/kg was infused over 10 min before subarachnoid block was initiated. Spinal puncture was performed with the patient in sitting position and using a midline approach at L3-L4 or L4-L5 with 26G Quincke spinal needle. The bevel of the Quincke needle was kept parallel to the dural fibres. Once clear cerebrospinal fluid was withdrawn, Inj. 0.5% heavy Bupivacaine 9-12.5 mg (1.8-2.5ml) was injected. The patient was immediately placed in supine position with left uterine displacement with wedge under the right buttock after administration of drugs for prevention of aortocaval compression.

Vitals were recorded at 5 minutes interval throughout the duration of surgery. Level of sensory and motor block was assessed. If systolic blood pressure decreased more than 20% below the baseline or to < 90 mmHg, intravenous Mephentermine and an additional intravenous fluid bolus of 500 ml of lactated Ringer's solution was given. If heart rate decreased to less than 50 beats/min, Atropine sulphate was administered intravenously. Then at the end of surgery patients were transferred in post-operative ward and advised to either lie in recumbent position for 24 hours or mobilize as soon as the effect of spinal anesthesia wear off and became ambulatory. Follow up of the patient was done after 24 hours, 72 hours and by telephone on the 7th day after operation or were asked to follow up in OPD if they had headache.

The nature and severity of headaches were characterized using the Visual Analog Scale (VAS) scale, 0 being no headache and 10 being worst imaginable headache.⁵ The most important criterion for classifying headache as PDPH was its postural nature. Transient headaches limited to the day of surgery were not considered as PDPH.

Functional grading (FG) of headache were divided into three categories:⁵ 1) Mild headaches were those not interfering with normal activities or lasting less than one day. 2) Headaches of moderate intensity interfered with normal activity and lasted > one day and < three days or required confinement to bed for < two days. 3) Severe headaches lasted > three days or required > two days of bed rest or required an autologous epidural blood patch.

The grading of headache was defined as follows:⁵ a) Grade I (mild) - VAS score 1-3 / FG rating 1. b) Grade II (moderate) - VAS score 4-7 / FG rating 2. c) Grade III (severe) - VAS score 8-10 / FG rating 3.

Therapy with NSAID's ± codeine and hydration was recommended to patients experiencing postural headache. An autologous epidural blood patch was offered when indicated by follow up. Pretesting was done in 8 patients, 4 in each group, who met the inclusion criteria. Following the pretest, true data collection was done. Data collection was done by filling the proforma containing the demographic details of the patient (age, weight, and height), hemodynamic changes and the severity of PDPH at 24, 72 hrs and after 1 week. Data was collected and recorded as per proforma. Data were analyzed by SPSS-16, and statistical analysis performed by chi-square test for proportions like incidence, duration and severity of PDPH. Overall significance level was maintained at $p < 0.05$.

RESULTS

There were total 100 patients, 50 in each group. Two cases, one in each group, were replaced by fresh cases to represent the sample with utmost attention to randomization and blinding (one case had to be converted to general anesthesia due to prolonged surgery secondary to postpartum hemorrhage and the other one due to multiple pricks). Out of 50 participants in each group, 4 (8%) in Group R and 3 (6%) in Group A had headache. The incidence of headache in both the study group was statistically insignificant ($p = 0.361$).

The PDPH at 24 hrs, 72 hrs, and 1 week in both the groups was statistically not significant, (Table 1, Table 2). All the moderate headaches were treated with Tab. codeine phosphate 15 mg three times a day and encouraged for oral rehydration. One patient with moderate headache in Group R needed an addition of Tab. Diclofenac SR 50 mg thrice a day; it subsided within 36 hours of starting of medications. All the moderate headaches treated with oral medications subsided within 72 hours of the onset. All the mild headaches subsided on itself with hydration and except for one in Group A who required Tab. codeine phosphate and subsided within 36 hours. None of the patients in either group had severe headache and no patients required autologous epidural blood patch.

Table 1: Severity of Post Dural Puncture Headache (PDPH) in Recumbent (R) group (n=50) after spinal anesthesia for Caesarean section

PDPH (Time)	Nil	Mild	Moderate	Severe	p Value
24 hrs	49	0	1	0	0.315
72 hrs	47	2	1	0	0.549
1 week	49	1	0	0	0.315

Table 2: Severity of PDPH in Ambulatory (A) group (n=50) after spinal anesthesia for Caesarean section

PDPH (Time)	Nil	Mild	Moderate	Severe	p Value
24 hrs	50	0	0	0	0.315
72 hrs	47	3	0	0	0.549
1 week	50	0	0	0	0.315

DISCUSSIONS

In this randomized comparative study, the incidence of PDPH after spinal anesthesia for Caesarean section in Group R (recumbent) was 8% while in Group A (ambulatory) was 6%. The incidence of PDPH was statistically insignificant ($p = 0.361$).

Spinal anesthesia is a form of regional anesthesia involving injection of low dose of local anesthetic into the cerebrospinal fluid of the patient's subarachnoid space to anesthetize the spinal nerve roots running through it. It is a relatively simple technique, which produces adequate surgical conditions by injecting a small amount of drug with easy landmarks.⁶

Some clinical studies suggest that postoperative morbidity and possibly mortality may be reduced when neuraxial blockade is used either alone or in combination with general anesthesia in some settings. Neuraxial blocks may reduce the incidence of venous thrombosis and pulmonary embolism, cardiac complications in high-risk patients, bleeding and transfusion requirements, vascular graft occlusion, and pneumonia and respiratory depression following upper abdominal or thoracic surgery in patients with chronic lung disease. Neuraxial blocks may also allow earlier return of gastrointestinal function following surgery. Proposed mechanisms include amelioration of the hypercoagulable state associated with surgery, sympathectomy-mediated increases in tissue blood flow, improved oxygenation from decreased splinting, enhanced peristalsis, and suppression of the neuroendocrine stress response to surgery.⁷ Spinal anesthesia also exposes the parturients and fetus to lower dose of local anesthetic and narcotic.⁸

The PDPH is debilitating complications of central neuraxial blockade with high incidence in the parturients, related to young age, female sex and decrease abdominal pressure after delivery of baby, promoting extra leakage of cerebrospinal fluid (CSF).⁹ The incidence of PDPH may lengthen hospital stay, may require epidural blood patch and interfere with

mother's care for her newborn.¹⁰ It is caused by leaking of the CSF through a tear in the dura causing intra-cranial hypotension, classically described as a postural, occipito-frontal headache, which occurs 24-48 hours after dural puncture. It can be associated with nausea, vomiting, neck stiffness, auditory or visual disturbances and may rarely progress to cranial nerve palsy, convulsions and subdural hemorrhage.¹¹

In spinal anesthesia, the incidence of PDPH is directly related to the needle diameter that pierces the dura mater,¹² thus, it can be reduced by careful selection of spinal needles. Although smaller diameter needle punctures used for subarachnoid block decrease the risk of PDPH, these needles are technically difficult to use and are associated with a lower success rate for spinal anesthesia,¹³⁻¹⁷ especially in inexperienced hands. This is due to failure to recognize dural puncture secondary to slow flow through a small needle, leading to multiple and repeated puncture attempts. Incidence of PDPH with pencil-point and size (27G) of spinal needle is reported to be between 0.5% and 1.5%. Hafer J, Rupp D, Wollbrück M et al.¹⁸ reported the incidence of PDPH with 26G Quincke to be 17.6%. Sadqa Aftab, Syed Nur-UI-Haq, Anjum Ara et al.¹⁹ in 2007 reported the incidence of PDPH with Quincke needle 26G to be 23.3% compared to 4.8% with Whitacre 25G needle which was significant (p value < 0.05). Viitanen H, Porthan L, Viitanen M et al.²⁰ in 2005 reported incidence to be 8.5% with 27G Quincke, the severity of which was mild 4%, moderate 3%, and severe 1% respectively. Corbey MP, Berg P, Quaynor H²¹ did a study to compare the severity of post dural puncture headache, using 26G and 27G Quincke spinal needle and reported the incidence to be 8% and 4% respectively. Despite slightly higher incidence of PDPH with cutting needles with respect to different studies, in our study, we have used 26G Quincke needle because of easy availability in the market and due to cheaper almost five times than the pencil point. We applied all the precautions like keeping bevel parallel to the dural fibres.

In our study, the incidence of headache was found to be 7% with 26G Quincke which is comparable with the various studies where incidence ranged from 2.06% to 23.3% in parturients.^{22,23,24}

In a similar study by Thornberry EA, Thomas TA et al.²⁵ in 80 obstetric patients with subarachnoid anesthesia, the patients with 24 hr bedrest or early (6h post spinal) mobilization found a significantly greater incidence of severe PDPH at 48 hr in the "bed-rest" group and three patients required blood patch. But the incidence in our study was almost similar in both the groups and no patient had incidence of severe headache or required epidural blood patch. So, the recumbency can be avoided, as it is an unnecessary stress for patients as well as medical staff.

Several studies have shown only few patients in the early mobilization group experienced headache while there was increased incidence of headache in the recumbent group.^{18, 22, 26-29}

Our findings is in line with other studies that bedrest per se in the routine care of patients following dural puncture does not have any beneficial role. On the contrary, it may even increase the risk of headache. Other potential disadvantages of routine bed rest include: inconvenience for patients for additional time spent in hospital, venous stasis, which may increase the risk of venous thromboembolism in predisposed patients, increased cost.

The grading of PDPH into mild, moderate and severe, as described more than 20 years ago, is based upon the limitation of normal daily function, a 'functional grading'. This has formed the basis for nearly all later proposals for grading of headache severity.³⁰⁻³²

Decreased incidence of PDPH, can be because of small gauge (26G) and bevel of the Quincke needle parallel to the longitudinal axis of the dural fibres, during insertion and removal, minimizing the leak.³³

Besides postural headache, two patients in the Group R complained of back pain at the site of

insertion of needle after 24 hours. Both patients had single prick, and there was signs of inflammation or localized pain at the puncture site. So, we concluded that it was back pain, possibly due to prolong recumbency.

Two patients, one in each group also had mild radiating pain with tingling sensation over left thigh. The onset of pain in one patient was 12 hours while in the other was 24 hours post surgery. Neurological examinations of both patients were normal and could be Transient Neurological Syndrome. The symptoms subsided within 72 hours.

CONCLUSIONS

Our study is a prospective, randomized comparative interventional study done to see the incidence of PDPH following early ambulation and recumbency in parturients undergoing Caesarean section using 26G Quincke needle. We found the total incidence of headache to be 7% with 8% in the Group R and 6% in the Group A ($p > 0.05$) which was comparable with the other studies done by different authors.

We concluded that 24 hours recumbency has no beneficial role in preventing the PDPH in parturients. Other potential disadvantages of routine bedrest include: the considerable cost and inconvenience for patients with additional time spent in hospital, venous stasis, which may increase the risk of venous thromboembolism in predisposed patients.

Hence, the results of this study indicate that routine bedrest should be abandoned, and that patients should be encouraged to mobilize freely after surgery as soon as they are able to.

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