

Comparison of 25 Gauge Cutting with Noncutting Needles for Post Dural Puncture Headache in Obstetric Patients

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Abstract

Introduction: Post dural puncture headache (PDPH) is the most common complication of dural puncture, occurring in up to 36.5% of spinal taps. Clinical and laboratory research have shown that use of small gauge needles particularly of the pencil point design is associated with lower incidence of PDPH than traditional cutting needles.

Objective: To compare the frequency and severity of postdural puncture headache between 25G cutting and non cutting needles used for subarachnoid block in patients undergoing cesarean section.

Study design: Randomized clinical trial

Place and duration of study: Department of anesthesiology, Dow university of Health Sciences, Karachi, Pakistan, during January 10, 2008 to July 9, 2008

Subject and methods: Sixty consecutive under the age of 35 years with class ASA I and II women were enrolled and randomly divided into two groups of equal size with 30 women in each group. The frequency and severity of PDPH was compared between 25G cutting and non cutting needles in patients under going elective cesarean section under spinal anaesthesia.

Results: The average age of the patients was 30.23 ± 6.6 years and 31.34 ± 5.6 in group I and group II respectively. There was no difference in baseline characteristics between groups as shown in Table 2. Lumbar puncture was successful in most of the patients in first attempt, 17 (90%) and 25 (83.3%) in group I and group II respectively. Out of 60 patients, 21.7% (13/60) patients had developed post dural puncture headache. Eleven (36.7%) of 30 patients had observed post dural puncture headache in group-I (25G cutting needles) and only 2 of 30 patients (6.7%) in group-II (25G non cutting needles). Severity of post dural puncture headache was significantly high in group-I than group-II on day 2 and day 3, (Chi-square test=8.56, df=3, P=0.036). None of the patients had traumatic punctures.

Conclusion: The frequency and severity of PDPH was higher in 25G cutting spinal needle group as compared to non cutting needle.

Keywords: PDPH; Cutting spinal needles; Spinal anaesthesia

Introduction

Post dural puncture headache (PDPH) is the most common complication of dural puncture, occurring in up to 36.5% of spinal taps [1,2]. Usually it starts 48 hours after the procedure (probably due to the continued leakage of Cerebrospinal fluid (CSF) through the dural puncture site) and may last up to 1 to 2 days or even two weeks [3]. Sometimes it is accompanied by nausea, vomiting, vertigo, tinnitus, diminished hearing and blurred vision. The headache is due to leakage of CSF through the dural puncture site into the epidural and paravertebral spaces faster than the production rate of CSF [4].

The incidence of headache after lumbar puncture is directly related to the size of the needle used at the dural puncture site. The incidence of PDPH was 20%, 12.5%, 4.5% after 25 G Quincke and 27 G Quincke needle and 27 G Whitacre needle respectively, during spinal anaesthesia [5]. In a study by Hwang [6] the incidence of headache was 1.06 %, 3.65 % and 2.08 % with 25 G Whitacre, 25 G Quincke and 26 G Quincke needle respectively [6].

Headache is more common with a large needle because of a larger leakage of CSF through the inflicted puncture of the dura. Also fewer headaches are seen with pin-point needles as compared to cutting needles. A dural puncture with leakage of CSF leads to low CSF pressure, absolute reduction of CSF volume below the cisterna magna with resultant downward movement of the brain and traction on pain-

sensitive structures in the cranial cavity, especially the pain sensitive basal dura [1,2]. The fact that CSF volume decreases during lumbar puncture seems to decrease the brain's supportive cushion and may also explain the headache.

Associated risk factors are: female, lower body mass index, young age, large needle size, beveled needle type compared with pencil-point needle of same size [7]. The pencil-point needle separates, rather than cuts, through the dural fibers, giving a significantly lower incidence of postspinal headaches [8]. The pencil-point needle (22-25 gauge) is indicated for spinal anaesthesia, but not for diagnostic use, as it does not allow free flow of CSF with resultant difficulty, in obtaining sufficient CSF [9]. On extensive search, data regarding comparison of 25 gauge cutting and non cutting is not available either local or international. This led us to conduct this study so that the frequency and severity

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of PDPH could be assessed and the better of the two could be used to prevent PDPH in subsequent patients undergoing spinal anesthesia for elective cesarean section.

Subject and Methods

Following Institutional Ethics Committee approval and informed patient consent, 60 consecutive women of ASA I and II, aged <35 years, para 1 to 2 undergoing spinal anaesthesia for elective Caesarean section were recruited. Women who had PDPH in the past, suffering from migraine, having coagulation disorder, aspirin ingestion in preceding week, pre existing neurological disorder, spinal deformity, had infection at puncture site and non consenting women were excluded from the study. They were randomly allocated into two groups 25G cutting (Group I) and 25G non cutting (Group II) spinal needle by a person not involved in the study by using sealed opaque envelop of group I and II. The researcher and patients were blinded to group allocation. Following intravenous administration of one liter of a balanced salt solution the patients were positioned in the right lateral or sitting position and lumbar puncture was performed in the midline either between L2-3 or L3-4 vertebrae by anaesthetist having >5 years of experience. Types of needles used were Quincke and Whitacre (B braun®).

Postoperatively patients were followed in the ward on day 1, day 2 and day 3 for incidence and severity of headache. The PDPH and its severity were assessed as per criteria given in Table 1. Women who developed PDPH were managed on pain medications conservatively.

The primary end point of this study was the incidence of PDPH of the patients. The sample size was based on the ability to detect a 30% reduction in the incidence of PDPH in group II. Given a project rate of 20 to 25% in the group-I and based on a one sided α level of 0.05 and a power of 0.80, 30 patients were included for each group. Data was analyzed on SPSS version 15. Age height and weight of the patients were presented in Mean \pm SD. Frequencies and percentages were presented for American society of Anaesthesiology (ASA) physical status, PDPH and its severity. Chi square test and fisher's exact test was applied to compare PDPH and its severity between two groups. $P \leq 0.05$ was considered level of significant.

Results

The demographic data of patients is shown in Table 2. The average age of the patients was 30.23 ± 6.6 years and 31.34 ± 5.6 in group I and group II respectively. The average weight of the patients was 74.2 ± 11.4 kg and 73.75 ± 10.3 in group I and group II respectively. The mean height of the patients was 158.87 ± 4.3 and 158.6 ± 4.9 cms in group I and group II respectively. There were 21 (70%) patients and 16 (53.3%) patients with ASA status I and 9 (30%) and 14 (46.7%) patients

Criteria for PDPH	
1.	Headache that occurred after mobilization
2.	Aggravated by erect or sitting position and coughing, sneezing or straining
3.	Relieved by lying flat
4.	Mostly localized in occipital, frontal or generalized
Criteria for Severity of PDPH	
No pain	
Mild	No limitation of activity and no treatment required
Moderate	limited activity and regular analgesics required
Severe	confined to bed, anorexic and unable to feed the baby

Table 1: PDPH and its severity assessment.

Variables	Group I (n=30)	Group II (n=30)	P-Values
Age(Years)	30.23 \pm 6.6	31.34 \pm 5.6	0.18*
Height (cm)	158.87 \pm 4.3	158.6 \pm 4.9	0.13*
Weight (Kg)	74.2 \pm 11.4	73.75 \pm 10.3	0.31*
ASA I	21 (70%)	16 (53.3%)	0.18**
ASA II	9(30%)	14 (46.7%)	0.18**

Results are presented as mean \pm standard deviation and n (%). *Unpaired t test ; **Chi square test

Table 2: Comparison of demographic and anesthetic characteristics between groups.

PDPH	Group I (n=30)	Group II (n=30)	P value
Over all PDPH	11 (36.7%)	2 (6.7%)	0.005
Number oflumber puncture attempts			
1 st Attempts	27 (90%)	25 (83.3%)	0.71
1st Postoperative day	None of the patients developed PDPH		
2ndPostoperative day			
No Pain	23 (76.7%)	29 (96.7%)	0.036
Mild Pain	7 (23.3%)	1 (3.3%)	
Moderate Pain	None of the patients developed moderate to severe pain		
Severe Pain			
3rd Postoperative day			
No Pain	19 (63.3%)	28 (93.3%)	0.036
Mild Pain	7 (23.3%)	1 (3.3%)	
Moderate Pain	2 (6.7%)	1 (3.3%)	
Severe Pain	2 (6.7%)	0 (0%)	

Data is presented as n (%). chi-square and fisher's exact test applied.

Table 3: Comparison of PDPH, attempts and pain between two groups.

with ASA status II in group I and group II respectively. There was no statistically significant difference found in age, height, weight, and ASA status between two groups (Unpaired t test, Chi square test applied, P-value \geq 0.05). Lumber puncture was successful in first attempt in 17 (90%) and 25 (83.3%) in group I and group II respectively and no statistically significant difference was observed (p value 0.71). Over all PDPH was observed in 11 (36.7%) and 2 (6.7%) patients in group I and group II respectively, and statistically significant difference was observed (Chi-square test=7.95, df=1, P=0.005) as shown in Table 3. As far as severity of pain was concerned, none of the patients experienced pain on first postoperative day in either group. On 2nd POD, no pain was observed in 23 (76.7%) and 29 (96.7%), mild pain was observed in 7 (23.3%) and 1 (3.3%) in group I and II respectively. On 3rd POD, most of the patients 19 (63.3%) and 28 (93.3%) had no pain in group I and group II respectively. Severity of PDPH was significantly high in group-I than group-II (Chi-square test=8.56, df=3, P=0.036). None of the patients had in our study.

Discussion

Postdural puncture headache has been regarded as the most common complication of spinal anaesthesia, [10] and it is particularly common among young female and obstetrical patients [11]. Even with a thicker 25 G (0.5 mm) Whitacre spinal needle the incidence of PDPH is significantly lower than when a thinner 27 G (0.41 mm) Quincke spinal needle is used [12]. Studies have revealed evidence in favour of a spinal needle with a pencil point tip such as Whitacre or Sprotte spinal needles [11,13]. However, some studies have failed to confirm this lower incidence of PDPH when using spinal needles with a pencil point

tip [14-16]. It is found that young age group have higher incidence of PDPH. The demographics of our study found to similar to the studies done by Tabedar et al. and Sharma et al. [17,18]. In another study of comparison of 25-gauge whitacre and 24-gauge sprotte spinal needle by Campbell et al. [19]. also had similar demographics.

In a study by Sharma et al. [20]. the incidence of PDPH was only mild in 4.3% in 25-gauge whitacre group (n=46 patients) whereas in 26-gauge Atraucan group it was mild in 2% and moderate in 2% out of 50 patients. We compared 25 G cutting and non cutting needle in our study and found that the proportion of PDPH was 6.7% in non cutting needle, which is slightly higher than the incidence stated in the above mentioned study. In a study at Kathmandu Medical College [21]. in which incidence of PDPH between 25 gauge Quincke needle and 26 gauge Eldor needle in elective C sections, was found to be 8.3% (5 out of 60) parturient which occurred all in Quincke spinal needle group which is lower than the incidence in our study. In a study by Campbell et al. they found the incidence of PDPH in whitacre group in 1 (0.66%) out of 150 parturients, and was severe in nature which supports the result of our study [19].

In a study by Sharma et al. [20] found 2 patients with severe, 2 patients with moderate and one patient with mild PDPH in Quincke group. Whereas in our study only mild pain was observed in 7 (23.3%) and 1 (3.3%) in Quincke and whitacre group respectively. There was no moderate or severe pain observed in our study in either group this could be due to small sample size of the study. In one study, seven (7.1%) in the Quincke group developed PDPH and two patients had severe headache, which is lower as compared to our results [18]. The incidence of post-dural puncture headache (PDPH) after the use of a standard spinal needle (Quincke) is, firstly, dependent on the size of the needle. In young female patients the mean incidence of PDPH, calculated from different studies, is around 15% when using a 25G needle [21,22].

The incidence of PDPH was 1.2% with 25 gauge Whitacre needles as found by Lambert et al. which is similar to our study [23]. The PDPH incidence was significantly higher in the Quincke group than the Sprotte and Whitacre groups [23].

The incidence of PDPH is more common among women than men, particularly prone are the parturients [23-25], because of the reduction of both the intra abdominal and epidural pressure after delivery, thereby promoting extra leakage of CSF than usual. Sex bound difference is caused by emotional and hormonal factors. Spielman mentioned the factors responsible for an increased incidence of PDPH in obstetric patient include stress of labour, changing hormonal level and dehydration. It is because of this reason that the study was conducted only in the cases of Caesarean Section.

Conclusion

The frequency and severity of PDPH was higher in 25G cutting spinal needle group as compared to non cutting needle. For spinal anesthesia, 25 gauge noncutting needles should be used.

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