Post Dural Puncture Headache after Cesarean Section, a Teaching Hospital Experience

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Abstract

Objective: This prospective study examined the frequency of Post-Dural Puncture Headache (PDPH) in 361 parturient women undergoing spinal anesthesia for cesarean section in a teaching hospital of Tehran University of Medical Sciences.

Materials and methods: Spinal anesthesia was performed using 25 gauge Quincke needles in all women. Patients were followed up to determine incidence of PDPH and then tried to compare those with or without PDPH using statistical methods to determine risk factors of PDPH.

Results: The overall incidence of PDPH was 10.8 percent in this study. In terms of probable risk factors which were compared between the two groups of patients, no statistically significant differences were found.

Conclusion: The incidence of PDPH in our study was higher than studies which used pencil – tipped needles and we determined that the occurrence of PDPH is not associated to some factors like the previous history of nonspecific headache, Body Mass Index, age, type of local anesthetic, previous history of PDPH, experience of operator, history of habitual tea and coffee drinking.

Keywords: Spinal anesthesia, Headache, Parturient, Obstetric

Introduction

Spinal anesthesia is a rapidly effective and safe method of regional anesthesia in obstetric patients (1, 2). A common complication of spinal anesthesia is postdural puncture headache (PDPH) (2). This complication is more common in parturient (3, 4, 5).

There are many variables that are suggested to be the main risk factors for pathogenesis of this complication (2-5). Some of well known and statistically proved risk factors in pathogenesis of PDPH are: type of needle tips (cutting), bigger needle size, younger age, parturient, multiple puncture, female gender, needles bevel direction (2, 5-9) . There are paucity of published reports related to uncontrollable variables such as history of headache other than PDPH, history of habitual drinking of tea, history of PDPH, thus we decided to study this complication in Women teaching hospital of Tehran University of Medical Sciences. This study was designed to find prospectively the frequency of PDPH in parturient undergoing elective or emergency caesarean section under spinal anesthesia and also nondependent variables in habitual and past medical history. We consider the potential implication of variables such as history of headache other than PDPH, history of habitual drinking tea or coffee, history of PDPH,

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Body Mass Index (BMI), time of doing the procedure, experience of operator, age of the parturient, and type of local anesthetics used in subarachnoid injection in frequency of PHPH using statistical methods.

In view point of ethics, we tried to control all variables which were proved previously to contribute to the pathogenesis of PDPH in literature (2). Furthermore, we have to follow the routine practice that was previously ordered by our seniors, as there was applied generally thus we did all dural puncture using cutting - tipped 25 gauge needles (Quincke), keeping bevel direction parallel to dural fibers.

Materials and methods

After approval of study by ethics committee we collected date on 361 ASAI – II patients who had spinal anesthesia for caesarean section at the Women teaching hospital. Informed consent was taken in preoperative evaluation clinic by attending anesthesiologist. All demographic information and medical history and physical examinations were performed by attending anesthesiologist. All patients had not any contraindication for spinal anesthesia such as coagulopathy, uncorrected hypotension, raised intracranial pressure or local infection in the site of injection (2).

All blocks were performed by the 4 anesthesiologists, and a group of anesthesia residents under supervise of attending anesthesiologist. Two other educated investigators who were blinded to the intra-operative events, conducted the postoperative review. After pre-loading with 500 mL of normal saline or Ringer's solution, spinal anesthesia was performed by 25 gauge Quincke needles in the sitting position. Pencil-tipped needles are more expensive than cutting – tipped needle in our country, furthermore, in our center many older attending sense more comfort and secure to use 25 gauge Quincke needle for all dural puncture. Thus considering our purpose to reflect and assessment the current situation and presenting the problems, and despite our real tendency to use smaller size needle, we select 25 gauge Quincke needle for all dural punctures.

All needles were inserted with the bevel oriented parallel to the longitudinal dural fibers, after successful lumbar puncture, the bevel turned 90 degree and 12-15mg of 0.5% hyperbaric bupivacaine or 1.6-1.8 mL of 5% hyperbaric lidocaine with or without epinephrine 0.1 mg or opioids (morphine sulfate 300-400µg or fentanyl 25-50µg) was injected. Immediately after intrathecal injection of local anesthetic, patients were placed in the supine position with a left lateral tilt to avoid aortocaval compression. A T4-T6 cutaneous anesthesia to pin-prick was obtained before skin incision in all patients. All cases were collected in a 9 months period. Routine monitoring i.e., noninvasive arterial blood pressure, electrocardiogram, and oxygen saturation was applied for all patients during operative and recovery period. Blood pressure was measured every 1 min for the first 10 min and thereafter every 5 min until the end of surgery.

Just after delivery lateral tilt of the operation table was removed. At the end of surgery, patients were observed in the recovery unit for 1 hr, thereafter they were returned to the obstetrics ward, provided fulfilling release criteria from recovery unit.

Patients were in 30 degree semi-sitting position for 24 hr and were allowed to ambulate as soon as possible if motor function fully returns in lower limbs. Two other colleagues reviewed each patient daily and were responsive for patient's claims about headache and followed them up for 3 days postoperatively. If direct questioning about classic PDPH was positive, the anesthesia consultation was performed and individual treatments including; partial rest, hydration, caffeine, acetaminophen, or advised to regular consumption of tee or coffee, in the case of mild to moderate PDPH, and more invasive treatments for eventually severe cases, were considered. Follow up was continuing, until 3th postoperative day.

PDPH was defined as headache worsened by standing or sitting up, and alleviated by lying down. PDPH was assessed by a visual analogue scale (VAS) from 0 to 10. Patients were divided into two groups: those who had not PDPH (zero scale) and other who had PDPH symptoms (VAS scales from 1-10). Severity of PDPH was assessed using a visual analogue scale (VAS) extending from0–10; 0 = no headache, 1–3 = mild headache, 4–7 moderate headache, >7 = severe headache.

Statistical analysis:

After matching the demographic and medical history record sheets with the PDHA scale of each patient, data were analyzed with SPSS v.13.0. Based on the body weight and height Body Mass Index (BMI=height/weight {in meter} ^{2}) was calculated for all the patients and BMI grouping of <25, 25-29 and <or =30 was applied for all the cases. Age grouping was also performed and patients were divided into two groups less than 25yr, and greater than 25yrs

based on their age. Basic descriptive statistics, including means, standard deviation and percentages were calculated for demographic data. We calculate percentage of occurrence of the risk factors in each group and then we used Pearson chi-square test to compare these percentiles between those with or without PDPH. Extracted P value forever possible risk factor was considered statistically significant if it was smaller than 0.05.

Results

Totally 361 healthy ASAI – II women were undergone spinal anesthesia for caesarean section. There were 39 patients with PDPH between all patients (10.8%).

Women were 18 to 44 years old (mean=28.7, STD Deviation=5.21). Among them 113 patients were under 25 years old and 248 were older than 25 years old. 12 parturient with PDPH were under 25 years old and 27 parturient with PDPH were older than 25 years, no statistical significant association observed between two groups (P=0.939).

Totally 263 parturient were anesthetized by attending anesthesiologists and 98 patients were anesthetized by residents of anesthesia, no statistically significant association discovered between these groups (P=0.343). There was not significant association between occurrence of PDPH and individual person whom performing spinal anesthesia (correspondent anesthesiologist or anesthesia residents) (P= 0.608).

Considering BMI, grouping (of <25, 25-29 and ≥30), there were not significant differences in PDPH occurrence between BMI groups (P=0.832).

Our analysis showed no statistically significant relationship between occurrence of PDPH and the time of performing spinal anesthesia (8am-2pm, 2-8pm, 8pm-2am and 2-8am) (p=0.990).

In patients who had PDPH, 27 out of 39 were anesthetized with bupivacaine %0.5 and 12 out of 39 were anesthetized with lidocoine %5, in which 4 of them were injected lidocaine plus epinephrine. There was not significant correlation between occurrence of PDPH and type of local anesthetics or additives including bupivacaine (P=0.073) and lidocaine (P=0.073), use of Intrathecal opioids as additive (P=0.934), use epinephrine with lidocaine (P=0.735). Statistical analysis showed us no relationship between type of local anesthetic and occurrence of PDPH (P=0.730).

One of possible risk factors which have some contribution to occurrence of PDPH is history of habitual consumption of tea or coffee, our study did not find any statistically significant association between history of habitual consumption of tea or coffee and occurrence of PDPH (P=0.214).

Any history of headache was hypothesized to have contribution to occurrence of PDPH. But our analysis did not find any statistically significant relationship (P=0.668).

We tested to find any causative relationship between history of PDPH in previous spinal anesthesia and occurrence of PDPH in this study; statistical analysis did not showed any relationship between them (P=0.746). All of mentioned information is depicted in table 1.

Table 1. Comparison of risk factors in patients with and without PDPH

	Number of patients with PDPH		Number of patients without PDPH		P-value
	No	Percent	No	Percent	
Injection by anesthesiologist	31	79.48	232	72.4	0.343
Injection by resident	8	20.51	88	27.6	
bupivacaine	27	69.23	262	81.61	0.073
Lidocaine	12	30.76	60	18.69	0.073
Lidocaine Plus epinephrine	4	10.25	39	12.14	1
BMI<25	7	17.9	31	10.3	
29.99> BMI > 25	15	38.5	128	42.4	0.357
BMI > 30	17	43.6	143	47.4	
History of coffee or tea drinking	23	59	156	48.4	0.214
Age < 25 years	12	30.8	101	31.4	0.939
Age > 25 years	27	69.2	221	68.6	
History of PDPH	4	10.25	28	8.7	0.746
History of headache other than PDPH	14	35.90	127	39.5	0.668
Total Number	39	10.8	322	89.2	

Severity of PDPH based on Visual Analog Scale (VAS) was assessed 3 times in first, second and third post-operative days. All PDPH cases had a mild (VAS=1-3) to moderate (VAS=4-7) severity and none experienced a severe PDPH (VAS=8-10). Even the majority of PDPH cases were grouped in mild category based on this classification. The maximum reported VAS was 5 in its most severe state in the first 24 hours and decreased to a VAS of 4 in the second 24 hours (Table 2). In the third 24 hours only 1 patient had a mild PDPH (VAS=1).

Table 2. Visual Analog Scale (VAS) scores based on post-operative days

time	number of PDPH's in day	Sum of VAS in day a	Mean VAS for groups in day b
First 24 hours	32	82	0.23
Second 24 hours	13	25	0.07
Third 24 hours	1	1	0.0028

a) Sum of VAS Scales of all patients with PDPH
b) Sum of VAS Scales of all patients with PDPH divided to number of patients with PDPH in that individual postoperative day

Discussion

The incidence of PDPH in our study was 10.8% which is higher than incidence of this complication in reports in which pencil-tipped needles were used [8, 10]. Most patients classified their headache as mild (<3 on the VAS). Meanwhile most cases occurred in the first 24 hours and gradually become better during the following days. No patient had severe headache and therefore there was no need to perform invasive therapies like Epidural Blood Patch.

It seems that in spite of high cost of pencil-tipped needles it is prudent to recommend use of this type of needle to reduce incidence of this complication in our teaching hospital. In this study we considered some variables other than variables which are known risk factors in pathogenesis of PDPH according to current literature. So we tried to compare two groups after performing spinal anesthesia, One group who had PDPH (VAS score of 1-10 according to VAS scale) and the other who had not PDPH (Zero in VAS scale). In none of variables we could find statistically significant difference between two groups.

History of headache and habitual tea or coffee consumption hadn't significant effect on occurrences of PDPH. Also, history of PDPH was not a risk factor for occurrence of PDPH in this study; therefore it may be considered that PDPH is an unpredictable and independent complication in spinal anesthesia.

The mean age of women in two groups was not significantly different and the overall incidence of PDPH in patients involved in our study was not related to age (P=0.939) or BMI (P=0.832). However considering the statistical observations, according to these results we can not rule out the effect of age and/or BMI on the occurrence of PDPH in other groups of patients.

Thus we conclude that, the occurrence of PDPH in parturient whom are candidate to cesarean section is not related to some variables like previous history of nonspecific headache, BMI, age, type of local anesthetic, Intrathecal opium or epinephrine administration, history of pervious PDPH, experience of operator, history of habitual drinking of tea or coffee and more studies may be needed to clear relationship of those variables with PDPH.

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