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The Rate of Headache after Caesarean Section and the Size of Needle for Spinal Anesthesia: Clinical Trial

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Abstract

Aim: the rate of postdural puncture headache (PDPH) was compared after caesarean section with spinal anesthesia using the 25 gauge spinal needle with the 27 gauge.

Methods: present study is a randomized clinical trial and 220 full term women entered for caesarean section. We entered full term women randomly for spinal anesthesia with the 25 gauge (group A) and 27 gauge (group B) Quincke spinal needles. In 3 postoperative days, we fallowed and compared Participants in 2 groups for the rate and severity of PDPH. PDPH was defined occipital or frontal headache that made hard the position on sitting or standing.

Results: Data of 220 patients were analyzed. The rate of PDPH was significantly higher in women in group A compared to group B at first (P=0.015), second (P=0.037) and third (P=0.005) follow up days. The severity of the PDPH was not significantly different between 2 groups in three follow up days. The rate of success in spinal anesthesia achievement was not significantly different between 2 groups.

Conclusion: The results of present study recommended that the size of spinal needle can effect on the rate of PDPH after caesarean section.

Keywords: Spinal anesthesia; Spinal needle; Postdural puncture headache; PDPH

Introduction

PDPH is a common complication after spinal anesthesia that defined as a headache that occurs in one day after spinal anesthesia. It is demonstrated with frontal or neck pain with at least 15 min duration when under spinal anesthesia patients sits up. Some studies reported that the rates of PDPH can be affected by the size and structure of needles that used for spinal anesthesia [1-3]. The rate of PDPH is higher in female gender and young age, so women are at higher risk in pregnancy. The reasons of PDPH may be decreasing in brain pressure due to leakage of cerebrospinal fluid (CSF) [4,5]. Leakage of CSF can increase the blood volume due to vasodilatation that may be induce headache [6]. Although, some studies suggest the size of needle is important for lower frequency of PDPH [2], some researchers reported no significant differences between fine and thick needles [7].

In this way, the aim of present study was to define the effect of needle size (the 25 versus 27 gauge Quincke spinal needle) on the rate and severity of PDPH.

Materials and Methods

Present study was a double blind randomized clinical trial that approved by the ethics committee in 2014 and 220 full term, cephalic and singleton pregnant women ≥ 38 week for gestational age were entered. Women were between 18 and 35 years old. They were considered for elective caesarean section with spinal anesthesia. Women were monitor exactly. Participants were randomly entered to one of 25 (group A) or 27 gauge (group B) Quincke spinal needle groups. All of women received 500 ml of ringer solution within 10-15 min before the spinal block. Spinal anesthesia was performed in equal method. Spinal anesthesia was done in the sitting position with a 25 or 27 gauge Quincke spinal needle randomly. Once free flow of CSF had been recognized the intrathecal anesthetic solution (12.5 mg of 0.5% heavy bupivacaine) was injected over 10 s, aspirating CSF at the end of injection to confirm needle position. The surgical technique was uniform in participants. Hypotension (decrease the systolic blood pressure to less than 90 mm Hg or decrease less than 20 mm Hg from baseline), nausea and vomiting also were recorded at the time of surgery. A nurse asked all participants for feeling of headache and recorded severity with visual analogue scale (VAS) for 3 days.

Statistical analyzes were done using SPSS 16. Continuous variables were analyzed using Student's T test. Nominal or ordinal variables were analyzed by Chi square test and Fisher exact test or Mann-Whitney U test. Statistically significant differences were defined by P<0.05.

Results

The mean of age in group A was 25.98 ± 3.51 and the mean of age in group B was 24.89 ± 4.46. There was no significant difference in mean of age between two groups (Table 1). Hypotension occurred in 95 patients (86.3%) in group A and in 76 patients (69%) in group B. The statistical difference between two groups was meaningful (P=0.007) (Table 1). There were no significant differences between the frequency of nausea and vomiting in group A (29%) vs. in group B (25.5%) (P=0.10) (Table 1).

The rate of PDPH was significantly higher in group A compared with the patients in group B at first (P=0.015), at second (P=0.037) and third days (P=0.005) (Table 2). There was no significant difference

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	Group A n=110	Group B n=110	*P* value
Age (year)	25.98 ± 3.51*	24.89 ± 4.46*	0.8
The number of try to attempt	2.20 ± 0.75*	2.59 ± 1.19*	0.05
Frequency of Nausea or vomiting	32 (29%)#	28 (25.5%)#	0.10
Frequency of Hypotension	95 (86.3%)#	76 (69%)#	0.007
The frequency of headache	29 (26.4%)#	17 (15.5%)#	0.04
The rate of success	118 (98.2%)#	104 (94.5%)#	0.28

Mean ± SD*, Number (percentage) #

Table 1: Baseline characteristics and outcomes of participants.

Frequency	Group A# n=110	Group B# n=110	P value	Severity	Group A# n=110	Group B# n=110	*P* value
Day 1	27 (24.5%)	10 (9.09%)	0.015	Day 1	3.21 ± 2,71	3.63 ± 2.64	0.25
Day 2	22 (20%)	11 (10%)	0.037	Day 2	4.12 ± 2.54	4.74 ± 2.25	0.06
Day 3	28 (25.5%)	12 (10.9%)	0.005	Day 3	4.04 ± 2.56	4.23 ± 2.34	0.57

Number (percentage) #

Table 2: Outcomes for PDPH.

between the patients in group A and group B regarding the severity of headache in three days (Table 2).

The rate of success in spinal anesthesia achievement was higher in group A, but the difference was not statistically significant between the two groups [118 (98.2%) in group A versus 104 (94.5%) in group B; P=0.28].

Discussion

The present study has shown that 27 gauge Quinke spinal needle was better than 25 gauge needle for preventing PDPH in healthy parturient that were undergoing spinal anesthesia for caesarean delivery but the severity of PDPH was not different between two groups.

Kang et al. [4] study similar to our study showed that smaller needle have lower frequencies of PDPH when a 26 gauge Quincke needle was used and 1.5% with a 27 gauge Quincke needle.

In contrast to our study, some researchers reported the rate of a PDPH has not decreased significantly with finer needles [7].

Wiesel et al. [8] compared the frequency of PDPH between the using 24 gauge Sprotte and the 27 gauge Quincke spinal needles. He showed that the severity of the PDPH was not significantly different between two groups.

Devcic et al. [9] compared the rate of PDPH between two different size spinal and type needles: The 24 gauge Sprotte versus the 25 gauge Quincke and reported no significant difference between them. We compared two different sizes of needles, but the type of needle was the same between two groups.

Santanen et al. [10] studied difference of the frequency of PDPH between 27 gauge Quincke and Whitacre needle. The incidence of PDPH in the Quincke group was approximately seven times more than Whitacre group.

Also many researchers found a leak reduction of PDPH when using a Whitacre needle compared with cutting point needles [10-14]. In our study the frequency of PDPHA was similar to Quincke group in their study. Although the use of fine-gauge spinal needles reduces the rate of PDPH, these are associated with increased risk of placement failure and bending [15].

Rand claimed that Increased gauge (25 g) led to a significant increase in deflection among bevelled needles [16] but we found in practice that failure of needle placement is higher with very fine needle, perhaps due to bending of these needles, and in our study the rate of failure in the first attempt was higher with 27 gauge needles than 25 gauge needles.

Conclusion

We found a lower rate of PDPH with the 27 gauge in comparison with 25 gauge Quincke needles. Our study confirms the effectiveness of the finer needles to prevent PDPH.

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