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ORIGINAL ARTICLE

A COMPARISON OF INCIDENCE OF POST DURAL PUNCTURE HEADACHE USING 25G QUINCKE AND 25G WHITACRE NEEDLE IN OBSTETRIC PATIENTS UNDERGOING CAESAREAN SECTION UNDER SPINAL ANESTHESIA

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ABSTRACT

Introduction: *Spinal anesthesia has offered a new armamentarium for the anesthesiologists and has been widely used in the Cesarean section in the field of obstetrics, an alternative to general anesthesia. However, Post Dural Puncture Headache remains an inevitable complication of spinal anesthesia and can be minimized its incidence by reducing the size of the needle and changing the design of the needle tip. The objective of the study was to find the incidence of post-dural puncture headache undergoing subarachnoid block for CS using 25G Quincke and 25G Whitacre needles.*

Materials and methods: *This study was conducted from August 2020 to January 2021 enrolling 72 parturients and were allocated in two groups of 36 each. Group A and B parturients received spinal anesthesia via 25G Quincke and 25G Whitacre in sitting position respectively. All the patients were evaluated based on incidence, onset, duration, and severity of headache postoperatively for 72 hours after the subarachnoid block.*

Results: *The incidence of post-dural puncture headache in this study was 7.2% in Group A and 3.15% in Group B which was statistically significant (P-value = 0.011), while there were no significant differences between these two groups in the onset, severity, and duration of post-dural puncture headache.*

Conclusion: *Despite no significant differences were found for the onset, severity, and duration of post-dural puncture headache, the use of 25G Whitacre is associated with a reduced incidence of post-dural puncture headache compared to 25G Quincke.*

Keywords: *cesarean section; post dural puncture headache; Quincke needle; spinal anesthesia; Whitacre*

INTRODUCTION

Since, the development of spinal anesthesia (SA) in the late 1800s, it is one of the commonly employed procedures for below umbilicus surgeries.[1] This technique of regional anesthesia is the most frequently performed anesthetic procedure in patients undergoing cesarean section (CS). However, one of the main disadvantages associated with the use of spinal anesthesia for CS has been the post-dural (meningeal) puncture headache (PDPH).[2,3]

To counter PDPH pencil-point needles were developed in 1951 by Whitacre and colleagues and that manipulation in needle tip significantly reduced the incidence of PDPH.

Negligible literature was found relevant to comparison studies between Quincke and Whitacre needles especially in our kind of health setup where resources are very limited. Hence, this study was undertaken to compare the incidence of PDPH with the use of 25G Quincke and Whitacre needles in patients posted for elective CS.

MATERIALS AND METHODS

This was a prospective hospital-based randomized comparative study carried out in the Department of Anesthesiology and Critical Care, Lumbini Medical College and Teaching Hospital, Nepal. The data collection was done from August 2020 to January 2021 after obtaining approval from Institutional Review Committee. Written informed consent was taken from all the patients. Parturients aged between 18-35 years of ASA (American Association of Anesthesiologist) II undergoing elective cesarean section giving valid informed consent were included in this study. Patients who voluntarily refused to give consent to take part in this study, infection at the site of injection, history of PDPH, history of non-PDPH headache, deranged coagulation profile, spinal deformity, pre-existing neurological disorder, and patients requiring

more than three attempts for lumbar puncture were excluded.

Seventy-two patients were randomized into two groups (Group A and Group B) by computer-based randomization method with thirty-six patients in each group. Detailed pre-anesthetic checkup was done before surgery and aspiration prophylaxis was given. On arrival in the operation theatre, intravenous access was secured with an 18 Gauge cannula in the non-dominant hand and ASA standard monitors were attached. Following intravenous preloading with Ringer's lactate solution at 15ml/kg dosage, Group A (n=36) received spinal anesthesia via 25G Quincke needle whereas Group B(n=36) received the block via 25 G Whitacre needle in the sitting position via midline approach at the level of L2-3 or L3-4 interspace by first and second year residents of the department of anesthesiology. Following the free flow of CSF 2ml of 0.5%, hyperbaric bupivacaine solution was deposited in the subarachnoid space. The patient was placed in a supine position and subsequently, the surgery was conducted after adequate sensory and motor blockade. As per departmental protocol, supplemental oxygen at 5L/min was given via face mask to all the patients. Hypotension was treated with bolus doses of injection mephentermine 6mg intravenously. Side effects of spinal anesthesia if occurred, such as nausea, vomiting, and bradycardia, were treated accordingly.

Post-surgery, all the patients enrolled in this study were followed by a blind observer for 72 hours and were assessed for headache. PDPH was classified as the presence of headache aggravated in sitting or erect position and reduced or relieved on lying in the supine position. Pain scores were given as per Visual Analogue Scoring (VAS) system.

All the statistical analyses were performed with SPSS (Statistical Package for Social Sciences) version 16. The continuous data were assessed by mean and standard deviation and discrete data by number and percentage. Student t-test and Fischer's exact test were used to determining the difference between groups. P-value<0.05 was considered as statistically significant.

RESULTS

All patients completed the study. Incidence of PDPH was 7.2% in Group A and 3.15% in Group B, which was statistically significant (P-value = 0.011) [Table1]. No significant difference was noted in terms of the day of onset of PDPH, severity, and duration of PDPH [Table 2, Table 3, and Table 4]. Patient characteristics were similar except for their age group. No statistically significant difference was found in terms of the type of needle used and incidence of PDPH when compared to their mean age. (P-value < 0.005) [Table 5]

Table no. 1: Incidence of PDPH

Needle	PDPH		Total
	No	Yes	
A	16	20	36
B	26	10	36
Total	42	30	72
P-value	0.011*		

*P value < 0.05

Table no. 2: Day of onset of PDPH

Needle	Day of onset			Total
	2nd	3rd	4th	
A	12	6	2	20
B	5	2	2	9
Total	17	8	4	29
P-value	0.661			

Table no. 3: Severity of PDPH

Needle	No PDPH	Mild	Moderate	Severe	Total
A	16	4	13	3	36
B	26	3	5	2	36
Total	42	7	18	5	72
P-value	0.070				

Table no. 4: Duration of PDPH

Needle	No PDPH	>48 hrs	24-48 hrs	Total
A	16	18	2	36
B	26	7	3	36
Total	42	25	5	72
P-Value	0.060			

Table no. 5: Mean Age according to PDPH and Type of needle

		Age (Mean ± SD)	P Value
Type of needle	A	26.06±3.82	0.71
	B	24.51±3.22	
PDPH	N	25.5±3.42	0.568
	Y	25±3.87	

DISCUSSION

Spinal anesthesia, though technically easier and safer in obstetric patients, can lead to PDPH which can be distressing to postpartum women. The incidence of post-dural puncture headache is related to the size and design of the spinal needle used, the experience of the anesthesiologist performing the dural puncture, and the age and sex of the patient. [4–6]

This prospective randomized comparative study was conducted among 72 parturients undergoing elective cesarean sections under spinal anesthesia. Cappe suggested the use of a pencil point lumbar puncture needle and the tip of the pencil point separates the longitudinal dural fibers without producing serious injury to dural fibers.[7] When the needle is withdrawn the fibers return to a state of close approximation.

Of 72 patients, 29 developed PDPH; incidence was 7.2% in the Quincke group and 3.15% in the Whitacre group, and the difference in the incidence was statistically significant. The headache was mostly throbbing in nature in frontal and occipital regions which was worsened with in 15 minutes of sitting and improved within 15 minutes of lying down. According to LD.Vandam et.al 75% of PDPH occurred by end of the third postoperative day and 85% by the 6th postoperative day, whereas in our study 17 patients developed a headache on 2nd post-operative day followed by 8 and 4 patients on the 3rd and 4th postoperative days respectively.[3]

In our study 7 patients had mild PDPH, 18 patients had moderate and 4 patients developed severe PDPH scored as per VAS system. Patients with mild headache were given conservative management in the form of adequate hydration, caffeine supplements, and bed rest. Patients with moderate PDPH were given conservative management along with paracetamol, 15mg/kg, IV thrice daily and patients with severe headache were given sphenopalatine ganglion block.[8] All patients responded well to the treatment options provided to them. Veeresham Madhupathy et al, reported that maximum patients had only mild intensity of PDPH and none of them suffered from severe PDPH on using 25G Whitacre and 25G Quincke needles.[9] Chiranjeevi et al. mentioned in their study that among 100 parturients who underwent CS doesn't require an epidural patch for PDPH. The result were consistent with our study.[10]

None of the patients in both groups complained of headaches in the first 24 hours. Shah et al. and Megha et al. had also mentioned similar findings in their studies.[11,12] Duration of PDPH was within 24-48 hours for only 5 patients in our study and exceeded 48 hours for 14 patients. Anju et al. study showed that the duration of headache for most patients was within 24-48 hours.[11] In only one patient, the duration of headache was up to 48 hrs similar to Lynch et al. No significant difference was noted in terms of age group in our study.[13]

Our study had a relatively small sample size in proportion to the burden of PDPH in the population. No demographic variables among the patients. Subarachnoid blocks were performed by the residents of the anesthesiology department.

CONCLUSION

Use of 25G Whitacre needle was associated with reduced incidence of post-dural puncture headache in our study in comparison to 25G Quincke needle. However, no significant differences were found regarding onset, severity, and duration of PDPH among the two groups of patients.

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