POSTDURAL PUNCTURE HEADCHE: COMPARISON OF 26G QUINCKE WITH 25G WHITACRE NEEDLE FOR ELECTIVE CAESARIAN SECTION

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ABSTRACT
Objective: *To compare the frequency of postdural puncture headache by comparing two spinal needles for subarachnoid anesthesia in patients undergoing elective cesarean section.*
Study Design: *Quasi experimental study.*
Setting & Duration: *The study was conducted from March to July 2007 at two private Hospitals of Karachi.*
Methodology: *Three hundred and fifteen women, aged 18-40 years, ASA physical status 1 and II undergoing elective cesarean section under subarachnoid anesthesia were selected to receive anesthesia either by using 26 gauge Quincke needle (group Q) or 25 gauge Whitacre needles (group W). Patients were followed for 3 days in ward, and were instructed to call on telephone one week later for presence of headache and, if present, its character, location, severity, duration and treatment.*
Results: *Overall incidence of PDPH was 14.23% (42 out of 295 patients). The incidence with Quincke needle 26 gauge was 23.3% (35 out of 150 patients) compared to 4.8% (7 out of 145 patients) with Whitacre 25 gauge needle which was significant (P-value < 0.05), most patients developed PDPH on 2nd postoperative day.*
Conclusion: *Use of 25 gauge whitacre reduces the incidence of PDPH.*

KEYWORDS: *Postdural Puncture Headache (PDPH), Spinal Anesthesia, Cesarean Section, Spinal Needle*

INTRODUCTION

Spinal anesthesia in obstetric is very popular for caesarian section because of its simplicity and rapid onset. It is economical and easy to perform.[1] It offers a dense and reliable block with profound symmetrical sensory and motor block. It also avoids maternal and fetal risk of general anesthesia, requires minimum postoperative care and provides postoperative analgesia.[2] Side effect associated with spinal anesthesia includes hypotension, nausea and postdural puncture headache, all of which are more common in the parturient.[3]

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Postdural puncture headache is defined as a headache occurring after dural puncture and has significant effects on the patients postoperative well being i.e. headache which is not only postural but also continues for more than 24 hours. PDPH is often treated with epidural blood patch.[4] Factors reported to influence the incidence of PDPH are age, sex, pregnancy, previous history of PDPH, needle size, needle shape, bevel orientation to the dural fibers, number of lumber puncture attempts, midline versus lateral lumbar puncture approach, type of local anesthetic solution and clinical experience of the operator.[5]

The conventional Quincke Babcock needle used for intrathecal anesthesia has cutting bevel with opening at the end of needle. The pencil point needle, Whitacre is bullet shape needle tip with rectangular eye situated farther away from tip, the pencil point needle is designed to push apart the collagen fiber of the dura bluntly instead of cutting by Quincke needle.[6] The incidence of PDPH may be reduced by the use of fine gauge 29 gauge Quincke needle, but associated with higher failure

rate, and slow flow of cerebrospinal fluid, particularly by inexperience hands leads to repeated dural puncture and thus contributing to PDPH.[7] However, the use of 25 gauge Whitacre needle has reduced the frequency of PDPH to an acceptable level of less than 3% without increasing the failure rate.[8] The objective of this study was to compare the frequency, severity and duration of postdural puncture headache by using 26 Quincke and 25 Whitacre needle in patients undergoing elective caesarian section.

METHODOLOGY

The study was conducted by three anesthesiologist, with same experience and qualification in two private hospitals from March 2007 to July 2007. After approval from two hospital administrations, informed and written consent was obtained from three hundred and fifteen pregnant patients undergoing elective caesarian section under spinal anesthesia. Patients selected were, aged 18-35 years, ASA physical status I and II with full term pregnancy by convenience sampling. Patients excluded from this study were with previous history of PDPH or migraine, bleeding diathesis, aspirin injestion in preceding week, pre-existing neurological disorder, infection at site of injection, abnormality of vertebral column.

During preoperative interview, all study patients were told that there was a < 5% risk of developing a spinal headache as a result of the procedure. All patients were prophylactically hydrated with 15ml/kg Ringer lactate intravenous before spinal anesthesia. Preoperative heart rate, respiratory rate, blood pressure and, oxygen saturation were recorded. After all aseptic measures skin was infiltrated with 2% xylocaine solution. A lumbar puncture was performed at the L2-3 or L3-4 intervertebral space by midline approach, with the patient in sitting position. Needle bevel inserted perpendicular to the direction of the dural fibers. Any backward movement of needle followed by redirection was classified as second attempt.

Upon entering the subarachnoid space, as evidenced by clear, free flowing CSF and aspiration test, the local anesthetic was injected. All patients received hyperbaric 0.75% bupivacaine 1.5 ml.

All patients were unaware about the type of needle utilized, but anesthetist performing the block was not blinded, as the two needles have different appearance making the blinding impossible. Maternal age, height, weight, parity, the type of needle and number of attempts at spinal needle insertion was noted on specially designed proforma for study. A T4-6 sensory dermatome level was obtained before surgical incision. Failed subarachnoid blockade was defined as no anesthesia or ineffective anesthesia for surgery following injection of the local anesthetic solution. Any intraoperative discomfort was treated by giving 0.1mg/kg nalbuphine.

Postoperatively, all patients in the study were seen daily by a resident unaware of the type of needle used and questioned for the presence of headache and, if present, its character, location, severity, duration and treatment A PDPH was defined as an occipital or frontal headache brought on by the erect position and relived when the supine position was assumed. Transient headaches limited to the day of surgery were not considered PDPH.[9]

The severity of headache was classified as mild headache no limitation of activity or lasting less than one day, headache of moderate intensity interfere with normal activity and lasted greater than one day and less than 3 days or required confinement to bed for less than 2 days. Severe headache lasted greater than 3 days or required greater than 2 days of bed rest or required a blood patch.[10] Grading was done by the authors without knowledge of the type of spinal needle used. When a patient complained of an occipital or frontal headache, she was monitored daily until she was discharged from hospital. All patients were instructed to inform for any sign or symptom of delayed onset headache upto one week. Patient with headache were evaluated for the duration of the headache and their response to treatment The PDPH was initially treated conservatively with bed rest, hydration, oral analgesic and caffeine in drinks. If PDPH persisted longer than 24 hours with same severity, a plan was to perform epidural blood patch before discharge from hospital. The decision to perform blood patch was made by concerned anesthesiologist. Statistical analysis was performed by using SPSS (statistical package for social science) version 10. Continuous variables (age, height, weight) were analyzed using unpaired test. Categorical variables were analyzed with Chi- square test. Data are expressed as means plus or minus the standard deviation, or as count and percentages. $P < 0.05$ was considered significant.

RESULTS

Three hundred fifteen women were included in this study, the Quincke needle was used in 150 patients and the Whitacre needle in 145 patients. 11 patients from Quincke group and 9 patients from Whitacre group were excluded because of lack of information on failed or inadequate block requiring general anesthesia. The data from remaining 295 patients were used for analysis. There was no significant difference in both groups regarding age, weight, height, ASA physical status and parity, the demographic data is presented in Table I. Both groups were compar-able for indications of surgery,

	Group Q (n=150)	Group W (n=145)
Age (years)	27.58 ± 4.13	28.08 ± 4.98
Height (cm)	157.36 ± 5.31	158.83 ± 5.42
Weight (Kg)	67.23 ± 11.54	67.75 ± 14.48
ASA (I/II)	145/5	142/3
Multiparity	45 (30%)	29 (20%)

Table I. Demographic Data

Group Q=26 guage Quincke needle, Group W=25 guage Whitacre needle, Values expressed as number (%) and mean ± SD, significant P-value < 0.05.

and include elderly primigravida, breech, contracted pelvis and precious pregnancy for elective cesarean section Only 8 patients had two attempts at lumbar puncture, 3 in Whitacre and 5 in Quincke group. Regardless of the number of attempt at lumbar puncture, the anesthesiologist was not allowed to switch to different needle.

The overall incidence of PDPH in both groups was 14.23% (42 out of 295 patients). The incidence of PDPH was 23.3% (35 out of 150) with Quincke and 4.8% (7 out of 145) in Whitacre group, which was significant (P-value <0.05). In Q group 17.3% (26 out of 150) patients, and 4.1% (6 out 145) patients in W group developed PDPH on second postoperative day. While 6% (9 out of 150) patients in Q group and 0.6% (1 out of 145) patient in W group developed PDPH on third postoperative day (Table II).

Considering PDPH severity, mild headache was 8% (12 out of 150) in Q group and 2.7% (4 out of 145) in W group, moderate headache 13.3% (20 out of 150) in Q group and 1.3% (2 out of 145) in W group, while severe headache 2% (3 out of 150) in Q group and 0.6% (1 out of 145) in W group. Mean duration of headache in Quincke group was 58.1 hours and 38.8 hours in Whitacre group Result on failed spinal and inadequate block was not analyzed, due to lack of information on number of attempt and traumatic spinal puncture. Intraoperative analgesia supplementation was required by 36.66% (55 out of 150) of the patients in the 26G Quincke group, compared with 37.24% (54 out of 145) of patients in 25G Whitacre group which was not significant.

DISCUSSION

There are many advantages of spinal over general anesthesia for elective cesarean section. The ease of the technique and rapid onset of block decreases anesthesia induction time. Spinal anesthesia also exposes the parturient and fetus to lower dose of local anesthetic and narcotic.[11] These advantages may be offset by a high

Table I. Age and Sex prevalence and risk factors of gastroesophageal reflux disease

Group Q (n=150)	Group W (n=145)	No. (%)
L2 - L3/L3 - L4	9 / 141	7 / 138
Number of dural puncture 1st/2nd	142(94.6%) / 8(5.3%)	140(96.55%) / 5(3.4%)
Analgesic supplementation	55(36.66%)	54(37.24%)
PDPH	35(23.3%)	7(4.8%)*
Onset of PDPH		
1st Day	--	--
2nd Day	26(17.3%)	6(4.1%)
3rd Day	9(6%)	1(0.6%)
Severity of PDPH		
Mild	12(8%)	4(2.7%)
Moderate	20(13.3%)	2(1.3%)
Severe	3(2%)	1(0.6%)
Mean duration of PDPH (hours)	58.1	38.8

Group Q=26 guage Quincke needle, Group W=Whitacre needle, PDPH=postdural puncture headache. Values expressed as number (%) and mean ± SD, significant P-value < 0.05.

incidence of PDPH which may lengthen hospital stay, require epidural autologous blood patch and interfere with the mother's care of her new born.[12] The correlation between needle size and incidence of PDPH is common knowledge.[13] Although the daily rate of CSF production by far exceeds the conjectural loss of CSF into the peridural compartment, this small amount seems to be sufficient to influence the sensitive equilibrium between reabsorption and production over days. PDPH results from loss of CSF, traction on cranial contents and reflex vasodilatation.[14] Based on this experience, needles that do not cut the collagen, but only expand the duramater bluntly, were created. Elastic form restoring forces of the dura are then thought to close the puncture hole.[15] One of the drawbacks to the use of spinal anesthesia for caesarian section has been the high incidence of PDPH in the parturient, related to young age, female sex and decrease intrabdominal pressure after delivery of baby, promoting extra leakage of CSF.[16]

Our data shows that both needles used in our study have the potential to lead to PDPH in obstetrics patients. Our study demonstrates that use of 25 gauge Whitacre needle reduces the incidence of PDPH in obstetric patients. Similar result demonstrated by various studies.[17,18] In our study incidence of PDPH using 26 gauge Quincke needle was 23.3%, compared to 2-12% reported by various studies,[19] which was much higher. The reason being that we inserted bevel perpendicular to dural fibers which produces large traumatic opening, and needles of different companies were used, as stylet protrusion beyond the tip of cutting needle could cause dural tearing and more chances of PDPH.[20] Similarly, 4.8% incidence of PDPH in 25 gauge Whitacre group of this study was higher, than 0.6% reported by Campbel.[10] however, it was consistent with the rate documented by Sharma (4%).[5]

It could be related to preoperative interview, as all study patients were told that there was a < 5% risk of developing a spinal headache as a result of the procedure, therefore postoperatively the method of interview by resident discovered incidence of transient PDPH symptoms. In this study most of the patients developed PDPH on second day, 17.3% in Quincke group and 4.1% in Whitacre group after the procedure, and all resolved within 48 to 60 hours of their onset, and responded to hydration, oral analgesic and caffeine drinks. None of our patient reported late PDPH, as symptom of PDPH could develop in 15 days after the lumbar puncture,[21] besides none of our patients in both group needed epidural blood patch.

There was no significant difference in number of lumbar puncture attempt in two groups. Intraoperatively, supplemental analgesia was required by 36.66% patients in Quincke group and 37.24% patients in Whitacre group. This showed some leakage of drug into epidural space despite of adequate CSF flow at the hub of needle,[22] might be due to non familiarity of both needles, as all three anesthetists had experience of using 25 gauge Quincke needle only.

Extra fluid administration during postoperative period was not recorded. The Whitacre needles are more expensive than Quincke needles, but postoperatively a need for more analgesics lead to a and fluid administration related to high incidence of PDPH leading to addition cost, which could offset that of Whitacre needles. Data on failure rate and inadequate block leading to general anesthesia was not analyzed as information was enough about the number of attempts.

CONCLUSION

Use of 25 gauge Whitacre needles reduces the incidence of PDPH, therefore, it is more suitable than 26 gauge Quincke needle in obstetric patients.

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