

To Compare the Frequency and Severity of Post-dural Puncture Headache (PDPH) in Parturients given Spinal Anaesthesia with 25G Quincke with that of 25G Whitacre Needle

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ABSTRACT

Objective: To compare the frequency and severity of PDPH in parturients given spinal anaesthesia with 25G Quincke with that of 25G Whitacre needle.

Design: Cross sectional comparative study.

Place and duration of study: Department of Anaesthesiology and Intensive Care Unit, Shalamar Hospital Lahore, November 2007 to April 2008.

Patients and methods: Sixty pregnant females aged 19-38 years, ASA physical status I and II with singleton pregnancy undergoing elective cesarean section under spinal anaesthesia were randomly allocated to receive spinal anaesthesia either by using 25G Quincke or 25G Whitacre needles. Patients were followed for 3 days postoperatively; Headache, its relation with posture, onset, duration, severity, treatment given and its response were recorded.

Results: The frequency of post-dural puncture headache was significantly higher in the Quincke (23.3%) group as compared to Whitacre (0%) group ($p \leq 0.05$). Most cases were observed between 24-48 hrs, had moderate headache and resolved within a week after its onset with conservative management.

Conclusion: Pencil point needles are associated with a lesser frequency of post-dural puncture headache as compared to cutting needles of the same gauge.

Keywords: Post-dural puncture headache, anaesthesia, spinal, postoperative.

INTRODUCTION

Spinal anaesthesia is one of the preferred modes of obstetric anaesthesia because of its simplicity, ease of performance and cost effectiveness.^{1,2} However this form of anaesthesia is also associated with some complications³. The development of post-dural puncture headache (PDPH) is one of the rising concerns in obstetricians and patients^{4,5,6}. It is now recognized that the patient may also suffer from associated nausea, vomiting, tinnitus, deafness and diplopia.^{3,7,8} Cases of subdural haematoma and death have also been reported⁹. Modern anaesthetic techniques have reduced the incidence of PDPH considerably. However because of the current popularity of spinal and epidural anaesthesia in fields such as orthopedics, obstetrics and the wide spread use of dural puncture in radiologic and diagnostic procedures, PDPH continues to be a major problem for inpatients and outpatients^{11,12}. A large number of factors can influence the development of post-dural puncture headache including the type of the needle, type of local anaesthetic and use of povidone iodine^{13,14}. We have selected this study to determine the frequency of PDPH in our population following

administration of spinal anaesthesia with spinal needles of two different designs but having the same size i.e. 25G. In addition, the severity was also noted among those who developed headache so that better management for future practice can be devised.

MATERIAL AND METHODS

This cross sectional comparative was conducted in the Department of Anaesthesiology & ICU, Shalamar Hospital Lahore. A total of 60 pregnant females were selected with non-probability purposive sampling. Inclusion criteria were ASA (American Society of Anaesthesiologists) physical status grades I & II, age between 18-40 years, gestational age more than 26 weeks. Parturients having fetal distress, pre-eclampsia/eclampsia, neuromuscular diseases, hypovolemia, acid base disturbances, infection on the back, and patients on anticoagulant therapy were excluded. Study was carried out after approval by Research and Ethics Committee of the Hospital. Written informed consent was taken from all subjects. Preoperative evaluation included detailed history, general, spine examination and routine laboratory investigations. Patients were divided into two groups of 30 each using random number tables. Patients in group I received anaesthesia with 25G Quincke

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needle while in Group II, 25G Whitacre spinal needle was used.

In the operating theatre, heart rate (HR) and blood pressure (BP) were monitored non invasively. Pulse oximetry was done using a finger probe. Three Lead ECG was recorded by ECG monitor. Patients were given 500 ml Ringer's lactate prior to spinal anaesthesia. A sub-arachnoid injection of 1.5-2ml 0.75% hyperbaric bupivacaine at L₃-L₄ interspace was administered by using 25G spinal needles with patient in the sitting position. The patients were placed in supine position to achieve the desired level of block. Dermatomal level of sensory block was assessed immediately prior to incision by pinprick sensation. Hypotension was managed by I/V fluids & Inj Ephedrine. Patients were evaluated by another anaesthesiologist for the occurrence of PDPH in both groups on 1st, 2nd & 3rd post operative days. No confounders were involved in this study.

All the relevant collected information of the proforma was entered into SPSS version 12 and analyzed through its statistical package. In our study, data were expressed as mean±SD where appropriate. Statistical analysis of frequency of post-dural puncture headache with two needles was performed by "Chi- square" tests. Probability values (P value) less than or equal to 0.05 were considered as statistically significant.

RESULTS

In this study, we divided 60 parturients going for elective caesarian section into two equal groups. In group I, spinal anaesthesia was delivered using 25G Quincke needle and in group II, 25G Whitacre needle was used. Mean age in group I was 28.6±4.62 years while it was 27.63±4.31 years in group II. Independent sample 't- test' was applied to compare the means in age and it was found to be non-significant (p-value >0.05) Table I. Seven patients (23.3%) in group I (n=30) developed post-dural puncture headache while none in group II experienced headache (p value ≤0.05). It was interesting to know that only 1(14.4%) patient developed spinal headache (PDPH) following multiple (>2) attempts. While 3(42.8%) patients developed headache following single & double attempts for dural puncture. Variables like dose of bupivacaine, level of block, supplementation required were identical in both groups. Most of the patients 5(71.4%) had their headache localized to frontal region. Occipital & temporal region distribution was seen equal (14.3%) in both groups. Among those who developed headache, 14.3% had mild, 57.1% had moderate & 28.6% had severe headache. None

of them encountered incapacitating headache and were managed with fluids and medication (Table II).

None required epidural patch. Headache was also adequately relieved in 85.7%, however, only 1(14.3%) was completely satisfied with the relief provided.

Table I: Age Distribution

Age	25G Quincke Group I	25G Whitacre Group II
Mean	28.60	27.63
S.D	4.62	4.31
Minimum	19	22
Maximum	37	38
Range	18	16

Table: II Management

Management	Freq.	%age
Hydration+ NSAIDs	1	14.3
Hydration+NSAIDs+Caffeine	6	85.7

DISCUSSION

General anaesthesia for Caesarean Section is associated with an increased risk to maternal health when compared with regional anaesthesia. Regional anaesthesia, in particular spinal anaesthesia, has come a long way since its introduction in late 1800s. It passed through phases of "Dark ages" and ultimately came out to be a superior choice in obstetrics¹⁵. Spinal anaesthesia is now known as safe, reliable & cost effective tool for painless cesarean section¹⁶. Spinal anaesthesia like other interventions is associated with complications along with its benefits. This list is not small, yet most of them are benign and often settle with the passage of time. Post-dural puncture headache PDPH is one of them¹⁷. The frequency of PDPH depends upon a number of factors like, age, sex, size, type and orientation of needle and the type of surgery performed. The frequency of distressing post spinal headache ranges from 0%-66% as reported by various authors at different times¹⁸.

In our study, only 7 patients out of 60(11.6%) developed headache. All were administered spinal anaesthesia with Quincke needle. Fauzia observed the frequency of PDPH in 20% parturients given spinal anaesthesia with 25 G Quincke needle while the results are slightly higher i.e. 23% for the same needle in our study. Malik observed a rate of 5% PDPH in his study conducted in Combined Military Hospital Lahore when 25 G Quincke needle used for spinal anaesthesia for different lower abdominal and perineal surgeries. It was interesting to note that all his subjects who developed spinal headache were young females undergoing cesarean section¹⁴.

Large spinal needles will clearly produce large dural perforations where the likelihood of a dural puncture headache is high. Conversely, the smaller needles provide small dural perforations with a lower incidence of headache¹⁹.

This large bore needle was associated with an incidence of 70% while newer small size needles are less likely to give such high rates.²⁰ Weasel observed that 12.8% of the parturients had PDPH when given spinal anaesthesia with 27G Quincke needle²¹. The gauge of the needle was kept constant in this study.

The type of the needle had been a "loved one" factor and very enthusiastically worked upon but still the range is quite varied. For 25G Quincke, it ranges from 3-25% while it is 0-14.5% for Whitacre needle of the same gauge.²² The reported results in the two groups are comparable with our observation i.e. 23.3% for 25G Quincke and 0% for Whitacre needle. Vallejo carried out a study on 1002 women undergoing elective cesarean delivery under spinal anaesthesia with different types of needle. According to him, the frequency of headache was 8.7% for 25G Quincke & 3.1% for Whitacre needle of same gauge²².

The rate of Epidural Blood patch for consequent management was 66% and 0 respectively other. No epidural blood patch was needed in patients included in this study. The results are a bit different for other types of needles. Devcic et al, found no significant difference in PDPH between pencil point Sprotte and Quincke needle inserted parallel to the dural fibers in obstetric patients. Quincke needle resulted in 67% more PDPH than Sprotte[®] needle, though the differences were not statistically significant. Tarkilla et al, who compared the Quincke needle and the Sprotte[®] needle, did not find a significant difference between the two²³. However patients of both sexes were used. Patients had orthopedic and urologic procedure. Mayer et al could not find a difference between Quincke and Sprotte[®] needle. However they used 27G Quincke in their study²⁴.

This study however showed that statistically significant reduction in post-dural puncture headache occurred when Whitacre needle is used.

Number of attempts is reduced with the experience of the anaesthetist. Experienced anaesthetist is likely to introduce needle in the subarachnoid space in fewer attempts. However controversy prevails over it as well. Spinal anaesthetic was delivered to all the patients included in this study by second year residents. It was interesting to note that only 1 patient (14.4%) out of 7 developed headache following multiple (>2) attempts. A similar finding was noted by Hintong who experienced an incidence of 9.2% with 25G Quincke which was irrespective of the experience of the

anaesthetist²². Ethnicity does not appear to have any impact on the development of PDPH. Nafiu et al reported an overall rate of 8.3% in his study done on West African parturients. The contribution of 25G Quincke in his study was less than 50% i.e. (4.15%)²³. Apart from pregnancy, higher rates of PDPH are noted in young and especially females. Wadud recorded 30% occurrence in young individuals (30-50 yrs) and higher percentage (40%) in females as compared to males (20%)⁸. Fauzia found that 9(18%) patients developed mild PDPH while (2%) developed severe headache out of 50 parturient given spinal anaesthesia with 25G Quincke needle¹. Shah on the other hand had the same rate i.e. (20%) in his study but all had mild headache. The severity of headache varied considerably in this study. Mild headache was seen in 14.3% and severe in 28.6%. Most of the patients who had this problem, experienced moderate headache (57.1%) that made it difficult for them to stay upright for more than ½ hr³.

There are number of treatment options for PDPH which range from simple measures like hydration, NSAIDs to complex intervention like epidural blood patch. Simple measures are very effective and manage most of the cases of headache. Goadsby found intravenous caffeine (500mg in 500ml n/s over 2h) to be very effective. As I/V caffeine preparations are not available in our setting, we had to rely on oral preparations. In our study, the combination of hydration, NSAIDs and caffeine relieved headache in 85.7% of the patients, hydration & NSAIDs relieved headache in rest (14.3%).

CONCLUSION

PDPH is not a rare complication. Most parturient with PDPH will experience the onset as early as one day and as late as seven days following dural puncture. There is a significant difference in the development of PDPH when pencil point (Whitacre) needles are used as against cutting (Quincke) type of needles. Pencil point needles are associated with a lesser frequency of post-dural puncture headache as compared to cutting needles of the same gauge. Headache following dural puncture is often managed with simple measures like good hydration, NSAIDs and caffeine.

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