

Comparison of Frequency of PDPH in Obstetrical Patients after Caesarean Section under Spinal Anaesthesia with 25 G Quincke (cutting) needle 25 G pencil point needle (non cutting)

KHALEEL AHMAD¹, MUHAMMAD JAVED², MAQSOOD ZAHID³, ANSER BUTTER⁴, ASIYA TAQI⁵, BABER ZAMEER⁶

ABSTRACT

Background: This study was conducted to compare the frequency of PDPH (post dural puncture headache) in Obstetrical patients after Caesarean section under spinal anaesthesia with 25 gauge Quincke needle (cutting) and 25 gauge Pencil point needle (non-cutting).

Methods: We randomized 100 patients into 2 equal groups; Groups were given names as Group A and Group B. In the Group A (n=50), 25 gauge Quincke needle was used for intrathecal block. In Group B (n = 50), 25 gauge Pencil point needle was used for the block. The groups were compared for the frequency of PDPH, as assessed for consecutive 3 days post operatively.

Results; Frequency of PDPH was comparable in both Quincke and Pencil Point needle groups (4% vs 14%),

but there was no statistically significant difference.

Conclusion: Use of 25 gauge Pencil point needle for spinal anaesthesia in Obstetrical patients does significantly reduces the frequency of PDPH as compared to 25 gauge Quincke needle.

Keywords: PDPH, anaesthesia, C- section, quincke needle

INTRODUCTION

There is an increase in the number of Caesarean Sections being performed under spinal anaesthesia. One of the complications of spinal anaesthesia is postdural puncture headache (PDPH), which occurs due to the leakage of CSF (cerebrospinal fluid) from dural puncture site and loss of buoyancy supporting the brain¹. The PDPH is usually occipital, begins on second postoperative day and responds to liberal fluids intake and paracetamol². There is increased incidence of PDPH in female gender, pregnancy, younger age (20-40 years old), and history of previous headache^{3,4}.

Amount of CSF leak depends on the size of dural rent that is in turn depends upon needle size. Fine needles leave small rents but identification of the space becomes progressively difficult as the needle size is reduced. Shape of the needle tip also determines the size of dural rent; sharp tips tend to cut the fibres and leave a larger rent whereas blunt tips will split the fibres and the resulting rent tends to close early⁵.

25 G Whitacre needles cause less headache than cutting needles without increasing the failure rate in obstetric patients⁶. Development of a traumatic "pencil point needles" led to a reduction in the incidence of post dural puncture headache to 0-2%⁷. Pencil point needle tip is associated with low incidence of PDPH as compared to Quincke needle of same size (1.1% vs 6%)⁸. The needle might initiate an inflammatory reaction that promotes early healing at the puncture site; it also splits the fibers rather than cutting them. The size of needle is another important factor in this subject. Smaller the needle, lower are the chances of PDPH⁹.

The purpose of our study is to compare the frequency of postdural puncture headache in obstetric patients undergoing caesarean section under spinal anaesthesia with 25 gauges Quincke or 25 gauge pencil point spinal needle in local population.

METHODOLOGY

After approval from hospital ethical committee 100 patients fulfilling the inclusion criteria will be briefed about the nature of the study and spinal anaesthesia. They will be asked to report any complaints of headache, nausea or vomiting to the doctor conducting the study. After obtaining an informed consent to participate in the study, they will be randomly allocated to one of two groups by draw

^{1,2}Assistant Professor Anaesthesia, Nawaz Sharif Medical College, Gujrat

³Assistant Professor Surgery, Nawaz Sharif Medical College, Gujrat

⁴Assistant Professor, Rashid Latif Medical College, Lahore

^{5,6}Consultant Anaesthetist, Hameed Latif Hospital, Lahore
Correspondence to Dr. Khaleel Ahmad Email: khaleelpadhyar@gmail.com drmaqsood_zahid@yahoo.com Cell: 0321-4591966

method (from the slips labelled Group A (50 slips) or Group B (50 slips) in a box. The demographic information including parity, age, height and weight will be recorded.

In pre-operative holding area, I/V cannula # 18G will be passed. 10 ml/kg of normal saline will be infused before the procedure. Pre operative heart rate and blood pressure will be checked. On arrival in the operating room, monitors (ECG, NIBP, Pulse oximeter) will be applied. The blocks will be performed by a trained anaesthetist who has the departmental permission to perform spinal anaesthesia independently. After preparing the area appropriate space (L2-L3 or L3-L4) will be identified under full aseptic precautions. 2% xylocaine will be infiltrated in the skin. After identifying the subarachnoid space by free flow of the CSF the block would be performed using 1.75 ml 0.75% Bupivacaine (Abbott). The patient will then be placed in the supine position with a wedge under the right hip. Upper level of the block will be assessed using alcohol swab before allowing the surgical team to proceed. Non invasive blood pressure will be recorded every 2.5 minutes; ECG and SpO2 will be recorded continuously. Hypotension will be treated with intravenous ephedrine in 5mg boluses. A fall in the blood pressure of more than 30% from the baseline or below 100mmHg will be noted as hypotension and recorded in the proforma.

The patients will be asked about any complaints of headache nausea or vomiting for three postoperative days. The character and severity of headache will be noted; which will be treated according to the departmental protocol given in the annexure. The postoperative nausea and vomiting will also be noted and treated with appropriate antiemetics.

Data will be analysed through computer software SPSS version 12. The demographic data, age will be presented both quantitatively in mean and standard deviation and qualitatively as percent of various age groups. The outcome variable, intensity of pain will be qualitatively analysed in percentage.

The outcome variable will be categorised and compared between two groups with application of Chi-square as test of significance at (P-value=0.05)

RESULTS

Table 1 compares the mean age between the two study groups. The mean age was 28.82 in group A (Quincke) and 28.34 in group B (Pencil point). Statistical analysis shows that there was no significant difference in the mean age of two study groups. (P-value 0.55).

Table 2 compares the mean age in Kilograms in group A (Quincke) and B (Pencil point). Mean weight was 76.38 and 80.48 with standard deviation of 11.183 and 14.088 in group A and B respectively. Analysis showed no significant difference in weights of the two groups.

Table 3 compares the categorized age of the two groups, 50 patients were recruited in each group with defined limits of 21-40 years. Statistical analysis showed no significant difference regarding the categorized age (P-value 0.12)

Table 4 explains the lumbar level used for spinal anaesthesia among the two study groups. Almost equal numbers of spinal were applied at L3-L4 and L4-L5 level in both group A and B. No significant difference was observed regarding lumbar level used (P-value 0.83).

Table 5 shows that on day 1 three patients were reported PDPH with Quincke needle and one patient with pencil point needle. However by applying Fisher's Exact Test no significant difference was observed on day 1 between two study groups (P-value 0.617).

Table 6 explains PDPH on day 2, one more patient was observed with PDPH in group A (Quincke) needle, rest of the patients were those who got PDPH on day 1. Statistical Analysis with Fisher's Exact Test showed no significant difference on day 2 between two groups (P-value 0.362)

On day 3 total numbers of patients who got PDPH with Quincke needle were seven as compare to pencil point group, who got two patients with PDPH. By percentage it was 14% in group A and 4% in group B comprising of 9% of the total population recruited for this study. Statistical analysis showed no significant difference between the two groups in terms of PDPH (P-value 0.160), although the % of PDPH was different between two groups (14% for group A and 4% for group B).

Table 1: Comparison of mean age between two study groups

Group	n	Mean age in Yrs	Std. Deviation	Std. Error Mean
A (Quincke)	50	28.82	3.685	0.521
B (Pencil Point)	50	28.34	4.355	0.616

Statistical analysis:

t-value= 0.595, p = 0.55 (> 0.05)

No statistically significant difference was observed in mean ages of the two study groups

Table 2: Comparison of Mean Weight between two Study Groups

Group	n	Mean age (yrs)	Std. Deviation	Std. Error Mean
A (Quincke)	50	28.82	11.183	1.581
B (Pencil Point)	50	28.34	14.088	1.992

Statistical analysis:

t-value= -1.612 p = 0.11 (> 0.05)

No statistically significant difference was observed in mean weights of the two study groups

Table 3: Comparison of age between two study groups

Age Category (years)		A (Quincke)	B (Pencil Point)	Total
21-25	Count	12	16	28
	%	24%	32%	28%
26-30	Count	21	23	44
	%	42%	46%	44%
31-35	Count	15	6	21
	%	30%	12%	21%
36-40	Count	2	5	7
	%	4%	10%	7%
Total	Count	50	50	100
	% within Group	100%	100%	100%

Statistical analysis:

Chi square=5.80 p = 0.12 (>0.05)

No statistically significant difference was observed regarding age (categorised) between the two study groups

Table 4: Comparison for Lumbar Level used (at which spinal was placed) between two study groups

Lumber level		A (Quincke)	B (Pencil Point)	Total
L3-L4	Count	32	33	65
	%	64%	66%	65%
L5-L5	Count	18	17	35
	%	36%	34%	35%
Total	Count	50	50	100
	% within Group	100%	100%	100%

Statistical analysis:

Chi-square=0.044 , p = 0.83 (>0.05)

No statistically significant difference was observed regarding Lumbar Level used between the two study groups

Table 5: Comparison of PDPH on day 1 between 2 study groups

PDPH (Day 1)		A (Quincke)	B (Pencil Point)	Total
Yes	Count	3	1	4
	%	6.0%	2.0%	4.0%
No	Count	47	49	96
	%	94.0%	98.0%	96.0%
Total	Count	50	50	100
	% within Group	100%	100%	100%

Statistical analysis:

Test Applied: Fisher's Exact Test (2-tailed) p=0.617 (>0.05)

No statistically significant difference was observed in PDPH on Day 1 between two study groups

Table 6: Comparison of PDPH on day 2 between two study groups

PDPH (Day 2)		A (Quincke)	B (Pencil Point)	Total
Yes	Count	4	1	5
	%	8.0%	2.0%	5.0%
No	Count	46	49	95
	%	92.0%	98.0%	95.0%
Total	Count	50	50	100
	% within Group	100%	100%	100%

Statistical analysis:

Test Applied: Fisher's Exact Test (2-tailed) p=0.362 (>0.05)

No statistically significant difference was observed in PDPH on Day 2 between two study groups

Table 7: Comparison of PDPH on day 3 between two study groups

PDPH (Day 3)		A (Quincke)	B (Pencil Point)	Total
Yes	Count	7	2	9
	%	14.0%	4.0%	9.0%
No	Count	43	48	91
	%	86.0%	96.0%	91.0%
Total	Count	50	50	100
	% within Group	100%	100%	100%

Statistical analysis:

Test Applied: Fisher's Exact Test (2-tailed) p = 0.160 (>0.05)

Inference: No statistically significant difference was observed in PDPH on Day 3 between two study groups. Although percentage of PDPH complication in group B (Pencil Point Group) was 4.0% as compared to 14.0% in group A (Quincke group) but this difference is not statistically significant at p=0.05

DISCUSSION

Spinal anaesthesia is a very popular technique employed by a number of anaesthesiologists nowadays in caesarian sections because of rapid onset, decreased exposure of parturient and fetus to unnecessary high dose local anaesthetics, inhalation agents and narcotics. These advantages may be offset by a high incidence of PDPH that may require autologous blood transfusion and interfere with mother's care of her newborn, lengthen hospital stay thereby increasing total cost .To minimize such a complication a number of new fine pencil point non dura cutting spinal needles have been developed.

One of them is Eldor (atraumatic) spinal needle which is assumed to be an ideal spinal needle for Obstetrical group of patients where the incidence of PDPH is high. Quincke spinal needle is easily available, commonly used and cheap but it has been found to have high incidence of PDPH.

A study by Ross BK, Chadwick HS, Mancuso JJ and colleagues found that in 366 Obstetrics cases incidence of PDPH was 9% with Quincke 25 gauge needle and 8% with 26 gauge Quincke needle as compared to only 1.5% with 24 gauge non-cutting needle¹⁰. Our study also favors that non cutting needles are superior in reducing PDPH incidence than cutting needles.

Hurley RG, Hurtwig LM, Johnson MD, Dutta S found that incidence of PDPH in Obstetric cases with 25 gauge Whitacre needle was 1.3 % vs. 5% with 26 gauge Quincke needle¹¹.

Mayer DC, Quance D, Weeks Sk compared 25 gauge Whitacre and 24 gauge Sprotte needles for elective PDPH remains a frequent complication of spinal anesthesia in the obstetrical population. It occurs most commonly in young female patients, particularly parturient and correlates with the configuration of spinal needle used¹². In the last 50 years the development of fine gauge spinal needles has enabled a significant reduction in the incidence of PDPH. In this study we compared two different lumbar puncture needle designs with smaller needle diameter.

In the present study of 100 patients for elective Caesarean section under spinal anaesthesia with 25 gauge spinal needles (Quincke vs Pencil point) of ASA grade I & II, were studied. After taking informed consent, detailed pre anaesthetic checkup and necessary investigations these patients were randomly allocated to 2 groups of 60 patients each. These 2 groups were:

Group-A: Obstetric patients with 25 Gauge Quincke needle.

Group-B: Obstetric patients with 25 gauge pencil point needle.

In obstetric patients, the height of sensory block was upto T4 or T6. There were statistically no significant differences between the groups with respect to the maximum sensory block height reached. The degree of motor block with the use of Bromage criteria showed a motor score of 1 or 2 in all the patients. This is in accordance with a study conducted by Tabedar S et al on 60 parturients where in Quincke group the sensory block achieved was T4 in 26 patients T6 in 1 and T8 in 1 patient and no anaesthesia at all in another 2 parturients as compared to T4 in 29 and T3 in 1 in Eldor group. The degree of motor block by all the patients was 1 or 2 in both the groups¹⁰. Our study results showed that there was significant reduction in PDPH incidence among Pencil point needle group.

This is also in accordance with the study conducted by de Diego Fernandez et al, Bano et al and Shutt Le et al¹⁵ who concluded that fewer cases of PDPH developed with pencil point needle than with

a Quincke spinal needle. However studies conducted by Jost U et al¹⁶ and Tabedar S et al who observed that Quincke needle was easier to handle, insert and was cheaper as compared to pencil point needle.

Incidence of Post Dural puncture Headache in obstetric patients using 25G Quincke and Pencil point spinal needles has varied greatly between the studies. Our study has observed age; pregnancy, size of the needle and shape of the needle tip to be the important determinant for PDPH.

Landau R et al¹⁷ conducted a study over 400 women using 25G and 27G pencil point needles. Their results favour that incidence of PDPH was more in 25G Whitacre (1.32%) group than 27G (0.03%) group. These figures favour our results that PDPH incidence increase as size of needle increases.

Tabedar and his colleagues conducted a study in 2003 to compare Quincke and Pencil point needle for incidence of PDPH for Obstetric patients. They recruited 160 pregnant women. Their results showed that incidence of PDPH were high with Quincke needle as compared to Pencil point needle (8% vs 2.2%). Our study showed the similar results that Pencil Point needles is better than Quincke in reducing incidence of PDPH¹⁸.

Results of our study were also in accordance with the study conducted by Bano F et al in 2004 at department of Anaesthesiology, Dow Medical College Karachi. They recruited 100 obstetrical patients to compare Quincke and Pencil point needles for frequency of PDPH. Their study concluded similar results that incidence of PDPH was more with cutting needles (4%) than with Pencil point needles (0.75%)¹⁹.

Gosch UW et al came up with similar conclusion in 2005 that non-cutting needles (Whitacre) are less atraumatic and decrease incidence of PDPH as compared to traumatic needles (Quincke) i.e.; 0.5% versus 5.75% respectively in obstetrical patients. This also strengthens the results of our study²⁰.

CONCLUSION

In summary we report that use of pencil point needles for spinal anaesthesia among parturient significantly reduces the frequency of PDPH. Moreover there is no significance difference among the two needle groups in terms of ease of insertion while applying spinal block.

REFERENCES

1. Frank R L Lumbar Puncture and Post-Dural Puncture Headaches: Implications for the Emergency Physician. J Emerg Med. 2008;35:149-57.

2. Imarengiaye C, Ekwere I. Postdural puncture headache: a cross-sectional study of incidence and severity in a new obstetric anaesthesia unit. *Afr J Med Med Sci.* 2006;35:47-51.
3. Wu CL, Rowlingson AJ, Cohen SR gender and post-dural puncture headache. *Anesthesiology* 2006; 105:613.
4. Malhotra SK, Iyer BR, Gupta AK, Raghunathan M, Nakra D Spinal analgesia and auditory functions: comparison of 2 sizes of Quincke needle. *Minerva Anesthesiol.* 2007 Jul-Aug;73:395-9.
5. Pan PH, Fragneto R, Moore C, Ross V. Incidence of postdural puncture headache and backache, and success rate of dural puncture: comparison of two spinal needle designs. *South Med J.* 2004;97:359-63.
6. Bano F, Haider S, Aftab S, Sultan ST. Comparison of 25-gauge, Quincke and Whitacre needles for postdural puncture headache in obstetric patients. *J-coll physicians surg pak.* 2004;14:647-50.
7. Turnbull DK, Shepherd DB. Post-dural puncture headache: pathogenesis, prevention and treatment. *Br J Anaesth.* 2003;91: 718–29
8. Choi PT, Galinski SE, Takeuchi L. PDPH is a common complication of neuraxial blockade in parturient: a Meta-analysis of obstetrical studies. *Can J Anesth* 2003;50:460-9.
9. Sohail B, Iqbal R, Sharif J, Zahoor U, Adnan A. Effect of the size of spinal needle on post-spinal headache - a comparison between 25 & 27 gauge quinicke needle. *P.n.s.Shifa, Karachi. Profesional Med J Mar* 2011; 18(1):51-56.
10. Ross BK, Chadwick HS, Mancuso JJ: Sprotte needle for Obstretical anaesthesia, decreases incidence of PDPH. *Reg anesth* 1992,17:29-33.
11. Hurley RG, Hertwig LM, Johnson MD, Dutta S. Incidence of PDPH in the Obstretic patient: 25 gauge Whitacre vs 26 gauge Quincke tip needles:- a preliminary report. *Abstrct 1991 SOAP Meeting.*
12. Brown ID. *Atlas of regional anaesthesia.* 2nd ed. New York: WB Saunders Company, 1992. p. 305-9.
13. De Diego Fernandez R, Tisner Madrid ml, Cabrerizo torrente P, SanJoaquin mur t. Comparison of two 27 - G - Caliber needles for spinal anesthesia. Study of 1,555 patients. *Servicio de Anesthesiologia Y Reanimacion, Hospital General Uni Gregorio Maranon, Madrid, 2003, p. 182-7.*
14. Bano F, Haider S, Aftab S, Sultan St. Complication of 25 gauge Quincke and Whitacre needles for post dural puncture headache in obstetric patients, department of anaesthesiology and surgical ICU, Dow University of Health Sciences and Civil Hospital, Karachi. 2004; 14:647-50
15. Shutt le, Valentine SJ, Wee my, Page rJ, Prosser a, Thomas Ta. *Anaesthesiol, Spinal anaesthesia for caesarean section: comparison of 22-gauge and 25-gauge Whitacre needles with 26-gauge Quincke needles. Br Anaesth.*1992; 69:589-94.
16. Jost u, Hirschauer m, Weinig e, Dor Sing c, Jahr c: Experience with G27 Whitacre needle in in-patient and outpatient settings-incidence of post dural puncture headaches and other side effects. *Anasthesiol Intensive med.* 2000, 35:381-7.
17. Landau R, ciliberto cF, Goodman Sr, Kim-lo Sh, Smiley rm. Complications with 25-gauge and 27-gauge Whitacre needles during combined spinal-epidural analgesia in labor. *Int J Obstet Anesth;* 2001,10:168-71.
18. Tabedar S. a comparison of 25 gauge Quincke spinal needle with 26 gauge Eldor spinal needle for the elective Caesarean sections: insertion characteristics and complications *Kathmandu Univ. Med J.* 2003;1:263-6.
19. Bano F, Haider S, Aftab S, Sultan St: Complication of 25 gauge Quincke and Whitacre needles for post dural puncture headache in obstetric patients, department of anaesthesiology and surgical ICU, Dow University of Health Sciences and Civil Hospital, Karachi. 2004;14:647-50.
20. Gosch uW, Hueppe M: Post dural puncture headache in young adults: Comparison of two small gauge spinal catheters with different needle design. *Anaesth,* 2005;94(5):657-61.