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ORIGINAL ARTICLE

Frequency of Post Dural Puncture Headache with Quincke 25g and Quincke 27g Spinal Needle after Spinal Anaesthesia

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ABSTRACT

Objective: To compare the frequency of post dural puncture headache with Quincke 25G and Quincke 27G of spinal needles for spinal anesthesia.

Design of the Study: It's a Randomized control trial.

Study Settings: This study was carried out Department of anesthesiology and Intensive Care Unit, Shaikh Zayed Hospital Lahore from 29-08-2020 to 01-03-2021.

Material and Methods: In this prospective study 100 patients were enrolled who were decided to undergo spinal anesthesia. Two groups were made by randomization. In patients of group I, anesthesia was administered by using 25G quincke needle while 27G quincke needle was used for patients in group II. Evaluation of patients was with regard to development of postoperative PDPH within 3-days. Groups were compared by using Chi-square test and a P-value<0.05 was taken statistically significant.

Results of the Study: PDHD was seen in 14 (28%) patients in group I and in 4 (8%) patients in group II. Statistically, the difference between the two groups was significant (p<0.05)..

Conclusion: Due to less frequency of PDPH with 27G needle, it should be given preference for applying spinal anesthesia over 25G needle.

Keywords: Spinal anesthesia, post dural puncture headache; quincle needle.

INTRODUCTION

In various indications like myelography, spinal anesthesia, intrathecal chemotherapy and diagnostic lumbar puncture, invasive procedure performed in routine is dural puncture. But, in practice of anesthesia, there may be unintentional dural puncture as well during analgesia or epidural anesthesia for different indications that include postoperative labour pain relief.[1] Post-dural puncture headache (PDPH) was defined by Carrie and Collins as a headache that occurs after Dural puncture and patient's postve operative well being is significantly affected by it.[2,3] PDPH resolves immediately but it is associated with significant morbidity. It also hampers ability of mother in taking care of her baby and herself also besides extending in length of hospital stay.

Using local anesthetic solutions for producing circumscribed areas for losing sensations in subarachnoid space is called spinal anesthesia. Local anesthetic agents are filtered in it which is bupivacaine usually, into spinal cord surrounding via lower back. Spinal anesthesia is administered by injecting drug in subarachnoid space directly, however, a cathether is used in epidural anesthesia for introducing drug in extramural space.[4,5]

Generally, occipital regions is affected and may result into stiffness of neck.4 It has common association with nausea, tinnitus, vomiting, hearing loss, dizziness, vertigo and visual disturbance like as cortical blindness or photophobias. Besides limb pain, it may also cause paraethesias of scalp. Its prevalence is more in young women who undergo caesarean section through spinal anesthesia.[6]

PDPH is caused by leaking of cerebrospinal fluid via puncture into dura created by spinal needle. Genesis of headache has been explained by many theories, but out of them two theories keep value.

Genesis of headache has been discussed by many theories but only two of them keep value. As per first theory, headache is caused by reflex vasodilatation while responding hypotension in CSF area.[7] As per crux of second theory, tractions of intracranial structure that is innervated for pain resulted by brain in order to accommodate upright positions to meet lower pressure of CSF causes PDPH. Neurologic syndrome is originated by C1 to C3 and 5th, 10th and 11th nerve roots cranial nerves.[8,9]

For reducing its incidence, anesthesiologists have always strived. To prevent PDPH, regional and international working groups have laid stress on using fine gauge needles. Followed by use of 25G Quincke (group 1) and 27G Quincke (Group II), spinal needles was 8.3% (14/168), 3.8% (6/160) respectively.[10] In another local study the PDPH was noted in 23% of patients in 25 G group 21 as compared to 88% in 27 G group.[11]

The rationale of my study was to see the actual frequency of PDPH with 27 G and 25 G Quincle in our population as there is controversy in the locally published literature. The study may prove reduction infrequency of PPDH; that in turn would result in better postoperative course after spinal anaesthesia.

MATERIAL AND METHODS

Before starting the study permission from Institutional Ethical Committee was obtained. The study was conducted at department of anesthesiology and Intensive Care Unit, Shaikh Zayed Hospital Lahore for six months period w.e.f 29/08/2020 to 01/03/2021. The study design was randomized control trial. Sample size of 100 patients; 50 patients in each group with 80% power of study, 5% significance level and taking expected percentages of post dural puncture headache in both groups,23%8 with 25G Quincke needle and 3.8%7 with 27G Quincke needle. Total 100 patients of both genders age between 18 and 35 years undergoing elective surgery with ASA grade I and II were included in this study. Patients with preoperative migraine, headache or with established hypertension, patient with chronic constipation and obese patients, BMI≥ 30 were excluded from the study.

The protocol for study was explained to all patients during their pre-operative visit to hospital. Patients were decided to undergo spinal anesthesia. Two groups were made by randomization. In patients of group I, anesthesia was administered by using 25G quincke needle while 27G quincke needle was used for patients in group II. In the post anesthesia care unit and after shifting towards the patients were observed for frequency of post

dural puncture headache and was recorded during 6 hour to 72 hours(as per operational definition). Structured questionnaire was used for gathering all information. The collecting data was entered and analyzed in SPSS version 17.0. Numerical variables were the age, duration of headache were presented as mean and standard deviation. Qualitative variables like sex, presence and severity of PDPH were presented as frequency tabulation. Cross tabulation was done for both groups for frequency and severity of headache. Groups were compared by using Chi- square test. P < 0.05 was considered as significant.

RESULTS

In Group 1 mean age of the patients was 25.84+5.79 years [range 18 – 35]. There were 12 (24%) patients of age slab of 18-20 years, 8 (16%) patients from age slab of 21-25 years, 14 (28%) patients were in the age slab of 26-30 years and 16 (32%) patients belonged to age slab of 31-35 years. (Table 1)

Group II patients mean age was 26.77+6.19 years [slab 18-35]. There were 15 (30%) patients from age slab of 18-20 years, 12 (24%) patients from age slab of 21-25 years, 9 (18%) patients were from age slab of 26-30 years and 14 (28%) patients were from age slab of 31-35 years. (Table 1)

In group I, there were 32 (64%) male patients and 18 (36 %) female patient. The male to female ratio was 1.8:1. In group II, there were 28 (56%) male patients while 22 (44%) patients were female. The male to female ratio was 1.2:1. (Table 2) In total, at the end of study, i.e. at completion of 72 hours, PDHD was seen in 14 (28%) patients in group I and in 4 (8%) patients in group II. Statistically, the difference between the two groups was significant (p<0.05). (Table 3)

At 24 hours, PDHD was seen in 9 (18%) patients in group I and in 2 (4%) patients in group II. But the difference was not significant (p <0.05) (Table 4)

At 48 hours, PDHD was seen in 3 (6%) patients in group I and in 1 (2%) patients in group II. But the difference was not significant(p>0.05). (Table 4)

At 72 hours, PDHD was seen in 1 (2%) patients in group I and in 1 (2%) patients in group II. But the difference was not significant (p>0.05). (Table 4).

Table 1: Distribution of patients by age (n=100)

Age	Group I		Group II	
	No.	%	No.	%
18 – 20	12	24	15	30
21 – 25	8	16	12	24
26 – 30	14	28	9	18
31 – 35	16	32	14	28
Mean + SD	25.84+5.79 (18-35)		26.77+6.19 (18-35)	
p-value	0.159			

Table 2: Patients distributed by sex (n=100)

Sex	Group I		Group II	
	No.	%	No.	%
Females	18	36	22	44
Males	32	64	28	56
p-value	0.958			

Table 3: Patients distributed by PDPH (n=100)

PDPH	Group I.		Group II		p-value*
	No.	%	No.	%	
No	36	72	46	92	0.009**
Yes	14	28	4	8	
Total	50	100	50	100	

* Chi-square test ** Statistically significant

Table 4: Patients distributed by PDPH by time duration (n=100)

Post Dural puncture headache	Group I				Group II				P-value*
	Yes.		No		Yes		No		
	No.	%	No.	%	No.	%	No.	%	
After 24 hrs	9	18	41	82	2	4	48	96	0.025**
After 48 hrs	3	6	47	94	1	2	49	98	0.307***
After 72 hrs	1	2	49	98	1	2	49	98	1.000***
Total	14	28	36	72	4	8	46	92	0.009**

* Chi-square test ** statistically significant *** statistically not significant

DISCUSSION

PDPH is a frequent problem seen after spinal anesthesia. This must be dealt adequately and prompt management should be done. Prophylactic measures may be taken to avoid it. One of the prophylactic measure is the choice of size of spinal needle. This study was a comparison of PDHD by using two different sizes of the spinal needles. The sizes compared in our study were of Quincke 25G and 27G. The study was based on the hypothesis that there must be a difference in frequency of PDHD with different size of needles. While using quickle needle, size of needle used directly determines the incidence of PDPH. Blunt tip or pencil point needles have lower rates of PDPH associated with them as they result less trauma to longitudinal fibers in dura so CSF leaks through small rent.

In this study, mean age of the patients was 25.84+5.79 years and 26.77+6.19 years. Shaikh et al. (2008) in Pakistan while conducting a similar study reported mean age of two groups as 25.8±5.60 and 26.4±5.86 years respectively.[12] Predominance of males was observed in both the groups during our study as 64% were male were 64% and 56% in both the groups correspondingly with p-value>0.05. However, in another randomized trial conducted by Ayub et al. (2019) all the patients were female.[13]

Some other authors reported prevalence of PDPD in the range of 0-37%.[14] Another study on young women found frequency of PDPH as 4-40%[15] while using 25G Quincke spinal needle. PDPD was reported in 9% patients by Ross et al.[17] Roheena and colleagues[16] reported PDPH severity in the range of mild to moderate and severe PDPD was not reported in any patient. Its severity was high on 1st post-operative day but on subsequent days, it decreased gradually. The range of PDPH frequency is 1.1%27 to 12.8%. while using 27 gauge Quincke needle.[18] But, more recently, while administering spinal anesthesia in caesarean section, 0% frequency of PDPH was reported by Muhammad et al[19] while suing 27G Quincke spinal needle.

Results of the study favored use of 27 G size needle with frequency of PDHD of 8% versus 28% with 25G needle size (p<0.05).Our these finding are closely related with the results of Kumar et al. (2020) PDPH in group 27 G (21% vs. 4.6%; p<0.05) and group 25G respectively.[20] But, findings of a study conducted by Shah and Colleagues matches with our study and they had reported 20% incidence of PDPH with 25 G Quincke needle while it was 12.5% with 27 G Quincke needle.[21] Rahman et al. (2017) 6.7% frequency of PDPH with with 27G Quincke needle and 16.7% with 25G Quincke needle.[22]

In our study, at the completion of the study, patients that had received spinal anaesthesia with 25 G needle (28%) had high PDPH in comparison with other group who received it with 27G needle (8%) and had statistical significance. There are some other studies which have compared the frequency of PDHD by using two different sizes of the needles. The results of these studies are variable. Dandona et al. (2016) exhibited a significantly reduced frequency of PDPH (10% vs 25%, p <0.05>) while using 27G

Quincke spinal needle in comparison with 25G Quincke spinal needles. [23] Syed et al. (2020) reported the overall incidence of PDPH was 14.67% and 23.68% (9/38) and 5.4% (2/37) patients who received spinal anesthesia with 25G and 27G needles respectively developed PDPH. However, it was not significant statistically..[24]

So, the above discussion reflects that frequency of PDHD is significantly lower in patients with 27 G needle, so it should be preferred over 25 G needle as both of them are available at the same cost. This study has some limitations. This was not a double blind study carried out in a single centre. This was not possible due to the difference in size of the needle. However, we did the randomization. The frequency of PDPH is also operator dependant and may also depend upon the technique, skills and number of attempts, which were not addressed in the study. However, a fellow of anesthesia who has at least 5 years' experience of conducting spinal anesthesia gave all the spinal anesthesia.

CONCLUSION

This study concludes that due to less frequency of PDPH with 27G needle, it should be given preference for applying spinal anesthesia over 25G needle.

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