Incidence of Post Dural Puncture Headache in Our Set Up with Quincke Spinal Needle: An Observational Crossectional Study

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Abstract

Introduction: Post-dural puncture headache (PDPH) is an iatrogenic complication associated with spinal anaesthesia. The occurrence of PDPH is determined by different factors. They are sex, age, pregnancy, past PDPH history, needle tip shape and needle size, bevel orientation, number of attempts, and approach used for lumbar puncture. We conducted the present study to find the incidence of PDPH.

Material and Method: After ethics committee approval, we observed 500 patients who had undergone surgery for lower abdomen and lower limb. Patients were randomly divided in Group A and Group B 250 patients in each group and received spinal anaesthesia via 23 and 25 quincke spinal needle respectively. They were followed post operatively regularly for development of any signs and symptoms of post dual puncture headache, which was end point of study.

Results: Out of 500 patients 6 patient developed PDPH. The incidence was 1.2%. There was no statistically significance with sex, number of attempts and guage of spinal needle.

Conclusion: In our series the incidence was 1.2% which is far less than other studies. Taking into consideration cost effectiveness & success rate we feel that in our setup we can continue with use of 23 & 25-gauge quincke needle.

Keywords: *Spinal Anaesthesia, Post dural puncture headache, Quinke spinal needle.*

Introduction

Spinal anaesthesia is one of the commonest anaesthetic technique used in lower abdominal and lower limb surgeries[1]. Variables of the needle design, such as needle size and needle shape have been adjusted to allow intrathecal injection and rapid flow of cerebral spinal fluid (CSF), while at the same time restricting Dural damage and loss of CSF[2,3] .Post dural puncture headache (PDPH) is an iatrogenic complication associated with spinal anaesthesia due to persistent leakage of cerebrospinal fluid (CSF) from the site of the puncture resulting in meningeal stretch. The occurrence of PDPH is determined by different factors. They are sex, age, pregnancy, past PDPH history, psychological stress of invasive procedure, needle tip shape and needle size, bevel orientation, number of attempts, and approach used for lumbar puncture[4,5,6].

A headache that occurs within 5 days of lumbar puncture and aggravates when standing or sitting and relives when lying flat is classified as postdural puncture

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headache (PDPH) on the grounds of the 3rd edition of the International Classification of Headache Disorder[7]. PDPH is a well-known iatrogenic complication of spinal anaesthesia that remains a major problem[8-11]. It is the downside to the use of spinal anaesthesia or diagnostic lumbar puncture resulting from the loss of CSF and the resultant strain on meninges excited by the hole formed in the dural tissues[2,12]. PDPH is normally moderate, without PDPH any movement restrictions, and no treatment needed when patients with extreme PDPH were confined to bed. An epidural blood patch (EBP), which injected the patient's own blood into the epidural space to cover the hole produced in the dural tissues, was used to treat severe PDPH[13]. PDPH's modifiable risk factors included needle size, needle shape, bevel and insertion angle orientation, stylus replacement, and operator experience[14]. Needle size could be the most significant factor in PDPH development[8,15,16]. Spinal needles commonly used today are 22 to 27 G, but sizes ranging from 19 to 30 G are available[1]. The incidence of PDPH following spinal anesthesia done with Quincke, a cutting needle, is 36% with a 22 G needle, 25% with a 25 G needle, 2% to 12% with a 26 G needle, and less than 2% with a 27 G needle[8,16-19]. The smaller needle diameter decreases the risk of PDPH[17,20]. 29 G needles will minimize the complication of PDPH but they are too thin to use[17].

Extremely thin spinal needle (29 G or smaller) will increase the probability of spinal anaesthesia failure. And multiple dural punctures resulting from unsuccessful puncture will increase the PDPH rate[15,21-24]. And occasionally CSF is too viscous for a small needle to get through[10]. As for the tip style, the cutting point needles were easier to insert through the skin and ligaments, while the dura mater was easier to identify by the pencil-point needles[25,26]. Some studies argued that the incidence of PDPH was not significantly different between cutting-point and pencil-point needles[27,28]. Some, opposed arguing noncutting needle lead to lower rate of headache[29-31]. Zhang D et al published a meta-analysis in 2000 had compared the frequency of PDPH between Quincke and pencil-point spinal needles which suggested that pencil-point spinal needle will significantly reduce PDPH rate compared with Quincke spinal needles[29]. However in this meta-analysis only Quincke spinal needle were included, while other cutting spinal needles were ignored. Zhang D et al in 2016 done a meta-analysis which showed Whitacre spinal needle was better than Quincke spinal needle.[24]

As the general assumption has been that the pencil point needle is better than cutting-point spinal needle for preventing PDPH. The cost of pencil point needle is much higher than cutting point spinal needle. This factor is of very much concern in our country. We decided to conduct an observational crossectional study to know the Incidence of post dural puncture headache in our set up with quincke spinal needle.

Material and Method

Methodology: Present study was conducted in the department of Anaesthesiology at Datta Meghe Medical College and Shalinitai Meghe Hospital and Research Centre Nagpur, in collaboration with Jawaharlal Nehru Medical College Datta Meghe Institute of Medical Sciences, Sawangi Meghe, Wardha. Ethical committee approval taken. All patients underwent routine pre anaesthesia check up with relevant investigations. We selected 500 patients who are posted to undergone surgery for lower abdomen and lower limb. Patients were randomly divided in Group A and Group B 250 patients in each group. Group A patients were received spinal anaesthesia with 23 gauge quincke spinal needle.

Group B patients were recieved spinal anaesthesia with 25 guage quincke spinal needle.

Inclusion criteria:

- Age 18yrs – 60yrs
- No Pre-existing headache
- ASA grade I and II.

Exclusion Criteria:

- Pre-existing headache.
- Age below 18yrs and above 60 yrs.
- ASA grade III and IV
- Contraindications to spinal anaesthesia.
- All were monitored routinely according to standard ISA guidelines. They were followed post operatively for development of any sign and symptoms of PDPH.

Patients were observed for

- Headache in frontal/occipital area,
- Increasing with sitting and standing
- Reliving with lying down.

- Any neck muscle spasm by
- Allowing them to describe themselves

Followed on day 0,1st, 2nd, 3rd and after discharge telephonically conversation with the concerning surgeon regarding the above symptoms for 4th and 5th day. Assuming that no feedback means no complaints. This we considered as end point of our study.

Those with signs and symptoms suggestive of PDPH were treated with bedrest, adequate hydration, IV Fluids, and analgesics like aspirin, codeine, paracetamol and sphenopalatine ganglion block twice daily for 2 days. Patients had complete relief of headache with above treatment. In sphenopalatine ganglion block patient were placed supine and bilateral nostrils anaesthetised with lignocaine jelly. Each nostril then inserted by swab stick soaked by 4% lignocaine in upward and backward direction till resistance is felt. After 5 minutes swab stick is removed.

Data collected and incidence of post dural puncture headache calculated.

Results

In this study it was observed that Mean age of participants was 30.1+9.5 years and Mean weight of participant's was 56.7+ 8.71 kg.

Table 1: Distribution of Study Group Based on Sex

Sex	Frequency	Percentage
Male	278	55.6%
Female	222	44.4%
Total	**500**	**100%**

Of the total 500 participants 278(55.6%) were male and 222 (44.4%) were female

Table 2: Distribution of study group according to gauge of quincke spinal needle

Guage of Quincke Needle	Frequency	Percentage
23 Guage	250	50%
25 Guage	250	50%
Total	**500**	**100%**

250 participants were received spinal anaesthesia by 23 gauze needle and rest 250 by 25 quaze needle**.**

Table 3: Distribution according to the frequency of headache:

Headache	Frequency	Percentage
Absent	494	98.8 %
Present	6	1.2%
Total	**500**	**100%**

In our study 6(1.2%) participants complained headache, while no headache was recorded in 494 (98.8%) cases.

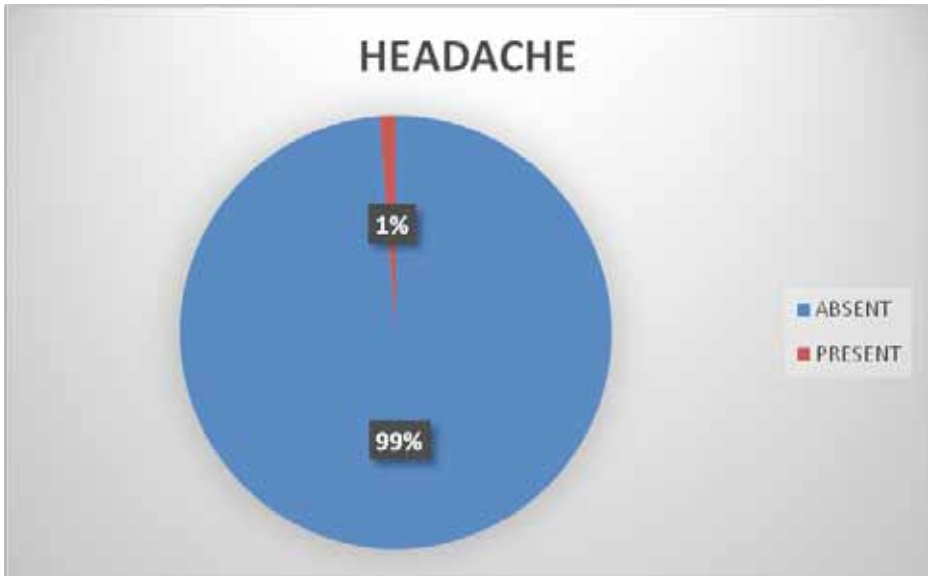

Figure 1: Headache

Table 4: Frequency of headache depending on type of needle:

Headache (p/a)	Gauge of Quincken Spiinal Needle				Total	P value
	23		25			
	N	%	N	%		
Absent	247	98.8	247	98.8	494	0.7, NS
Present	3	1.2	3	1.2	6	
Total	**250**	**100**	**250**	**100**	**500**	

NS: Not Significant

The incidence of headache is 1.2% for both 23 and 25 gauze needle (P=0.7,NS).

Table 5: Statistical analysis of headache based on sex

Sex	Headache				Total	CHI Square	P
	Absent		Present				
	N	%	N	%			
Male	276	55.2	2	0.4	278	1.2	0.269
Female	218	45.6	4	0.8	222		
Total	**494**	**98.8**	**6**	**1.2**	**500**		

The incidence of headache in males is 0.4% and females is 0.8%. (P=0.269, NS)

Table 6: Statistical relationship between no of attempts and incidence of headache

No of Attempts	Headache				Total	CHI Square	P
	Absent		Present				
	N	%	N	%			
1	396	79.2	4	0.8	400	0.675	0.411, NS
2	98	19.6	2	0.4	100		
Total	**494**	**98.8**	**6**	**1.2**	**500**		

0.8% of incidence was there for spinal on 1st attempt and 0.4 on second attempt.

Discussion

Regional anaesthesia particularly spinal anaesthesia is well established popular technique. Because of its safety profile, ease of administration and cost effectiveness it continues to be the technique of choice in most of below umbilical surgeries unless contraindicated. Never the less like other techniques it is also associated with complications. Post-dural puncture headache (PDPH) is one of the complication which needs concern and attention. Incidence of PDPH depends upon number of variables such as age of patient, sex, size, type & orientation of needle.[2,4,5,7-29] The frequency of PDPH ranges from 0% to 36%.[11,19-22]

In our study 6 patients out of 500 (1.2%) developed headache. Among this 3 (0.6%) patients belonged to 23 NO quincke group and 3 (0.6%) belonged to 25 NO QUINCKE group. Study done by Malik et al found out the incidence of PDPH was 5 percent with 25 G Quincke Babcock spinal needle.[32]

Large spinal needles will produce bigger defects in dura so chance of dural puncture headache is more in comparison with smaller needles which produce small dural defects & less incidence of headache[14,20]. This large bore needle was associated with an incidence of 70 percent whereas advanced small size needles are less likely to produce higher incidence. In a study done by

Weasel observed 12.8% incidence in pregnant patients with 27G Quincke needle was used.[33]

In contrast in our study we observed overall 1.2% incidence with both 23 and 25 gauze quincke spinal needle. We divided our patients in two groups, 250 in each based on the quaze of quincke spinal needle 23 and 25. We haven't found any significance of quaze of spinal needle associated with PDPH, p value is 0.7.

Number of puncture attempts can be reduced by the experience of the Anaesthesiologist. Experienced anaesthesiologist is likely to get success in first pass. In our study spinal anaesthesia was performed by the anaesthesiologist with atleast 3 years of experience in single puncture in 400 patient out of which 4(0.8%) patient had PDPH and in second attempt in 100 patient out of which 2(0.4%) patient had PDPH. We haven't found any association with the no of attempts and associated PDPH, p value is 0.4. Wail N khraise et al conducted a study in 2015 showing that the incidence of PDPH is higher with the repeated no of dural puncture headache.[34]

In our study we haven't found any significance regarding the sex of patient for PDPH. The p value is 0.26. Total 4(0.8%) female patients and 2 (0.4%) male patient had headache. Faramarz Mosaffa et al conducted a study in 2007-8 stating that females have higher incidence of PDPH after spinal anaesthesia.[35]

Treatment options for Post dural puncture headache includes simple measures such as adequate hydration, NSAID"S to complex procedures as epidural blood patch. Simple measures are very effective in managing most cases of PDPH. In our study NSAID"s hydration & adequate rest and sphenopalatine block relieved headache in patients[36]. Studies on other anaesthetics and related aspects in this region are available [37-44].

CONCLUSION

PDPH is not a rare complication associated with spinal anaesthesia. Though incidence can be reduced it's not preventable. In our series the incidence was 1.2% which is far less than other studies. Taking into consideration cost effectiveness & success rate we feel that in our setup we can continue with use of 23 & 25-gauge quinckie needle.

Limitation of the study:

Though the results are satisfactory with the finding, we need to increase the data base for needle guaze, sex, no of attempts and continue with the follow up may be with formulation of post-operative questionnaire which will be filled by the patient regularly.

Ethical Clearance: Taken from institutional ethics committee.

Source of Funding: Self.

Conflict of Interest: Nil.

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