



Incidence of Post Dural Puncture Headache (PDPH) Following Subarachnoid Block with 25G & 27G Quincke Spinal Needles in Patients Posted for lower Abdominal Surgery

Authors

Dr Chandra Bhushan Kumar¹, Dr. Ashutosh Kumar Jha²

¹Junior Resident, Department of Anaesthesiology, KMC, Katihar, India

²Professor & Head, Department of Anaesthesiology, KMC, Katihar, India

Abstract

Introduction: Post dural puncture headache (PDPH) first described by Augustus Bier in 1898⁴ from his personal experience following a failed attempt of spinal anaesthesia on himself due to mechanical difficulty. However his Assistant Hildebrandt⁴ successful in this regard in the same year and he also experienced PDPH. Two most important predictors of (PDPH) are type of spinal needle and its size^{5,6}. In 1951 Hart and Whitacre⁷ reported lower PDPH rates with pencil point needle (Whitacre) than cutting (Quincke) type of needle. Till date, numerous studies demonstrated lower incidence of PDPH following spinal anaesthesia with the use of smaller size spinal needle in comparison to larger one.

Method: The study was a randomized, single blind, non placebo comparative study which includes 130 patients with ASA grade I & II of either sex, between the ages 25 years to 50 years going for lower abdominal surgery. cases was divided randomly into two groups: Group A with 25G and Group B with 27 G Quincke needles. 3.5ml 0.5% Bupivaccaine heavy was injected intrathecally at either L₂-L₃ or L₃-L₄ interspace in every patient after computer generated Randomization.

Result: In our study it is observed that the percentage of PDPH in group A 21% and that of group B 4.6%. Group A & Group B were comparable with regard to age, sex distribution & ASA grading so no statistical significant difference were found with regard to these parameters.

Conclusion: It can be concluded from our study, large bore cutting type of spinal needle (25G Quincke), produces more PDPH than small bore cutting type of spinal needle (27G Quincke).

Introduction

Spinal anaesthesia (Subarachnoid anaesthesia SAB) first introduced by **Augustus Karl Gustav Bier**, a German surgeon who used 3ml of 0.5% cocaine intrathecally on six patients for lower extremity surgery in 1898^{1,2}. Thereafter, fears of neurologic deficits and complications caused anaesthesiologists to use less of spinal anaesthesia. The development of novel intravenous anaesthetic agents and neuromuscular

blockers coincided with the decreased use of spinal anaesthesia. In 1954, **Dripps and Vandam** described the safety of spinal anaesthetics in more than 10,000 patients and spinal anaesthesia was again revived³. Spinal anaesthesia is most commonly used regional anaesthesia technique today.

Post dural puncture headache (PDPH) first described by Augustus Bier in 1898⁴ from his personal experience following a failed attempt of

spinal anesthesia on himself due to mechanical difficulty. However his Assistant Hildebrandt⁴ successful in this regards in the same year and he also experienced PDPH.

Two most important predictors of (PDPH) are type of spinal needle and its size^{5,6}. In 1951 Hart and Whitacre⁷ reported lower PDPH rates with pencil point needle (Whitacre) than cutting (Quincke) type of needle. till date, numerous studies demonstrated lower incidence of PDPH following spinal anaesthesia with the use of smaller size spinal needle in comparison to larger one.

Aims and Objectives

This study was done to compare the incidence, onset, severity and duration of PDPH between Group A (25G Quincke needle) and Group B (27G Quincke needle).

Method

The study was a randomized, single blind, non placebo comparative study which includes 130 patients with ASA grade I & II of either sex, between the ages 25 years to 50 years going for lower abdominal surgery. Cases was divided randomly into two groups: Group A with 25G and Group B with 27 G Quincke needles. 3.5ml 0.5% Bupivaccine heavy was injected intrathecally at

either L2-L3 or L3-L4 interspace in every patient after computer generated Randomization. At the end of the operation, a decrease of at least two segments regression of maximal sensory block was sought; if not present we checked the parameters every 10 mins interval by Pin prick method. After achieving aforesaid criteria along with cardiovascular stability patients were allowed to shift to the ward. In the post operative period the frequency and severity of PDPH were noted upto the 5thpost operative day. Other complications (if any) were also noted. Post operative analgesia was provided with inj. Diclofenac (water soluble) 75mg i.m. 12 hourly⁷ along with Inj. Tramadol 100 mg i.m. 8 hourly for first 48 hours. After then oral NSAID was given along with oral H2 blocker. Occurrence of PDPH was treated by bed rest, enhancement of fluid intake, analgesics, caffeine and avoidance of straining. In refractory, PDPH, treatment protocol was epidural blood patch.

Result and Analysis

1) Comparison of Demographic Data's of Both Groups

Group A & Group B were comparable with regard to age, sex distribution & ASA grading so no statistical significant difference were found with regard to these parameters.

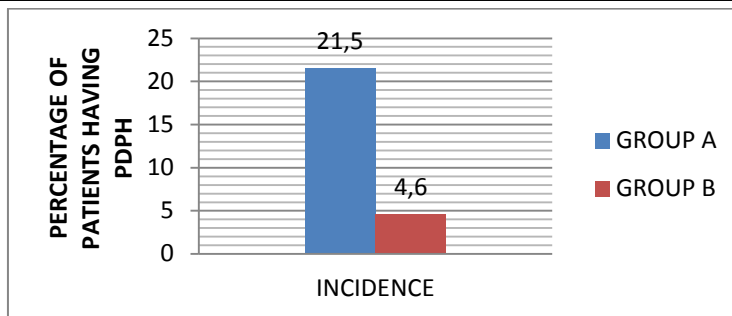
Table 1: Comparison of demographic data's

PARAMETERS	GROUP – A	GROUP - B	p- VALUE
AGE (25- 32 YRS)	19	15	
(33- 40 YRS)	15	24	0.751
(41- 50 YRS)	31	26	
SEX RATIO (MALE:FEMALE)	35:30	30:35	0.602
ASA GRADE (I : II)	50:15	53:12	0.520

2) Comparison of Incidence of PDPH in Both Groups

Table 5: Incidence of PDPH in both groups

TOTAL NUMBER OF PATIENTS= 130	GROUP – A (n=65)	GROUP B (n=65)
PATIENTS HAVING PDPH	14	3
PERCENTAGE	21%	4.6%

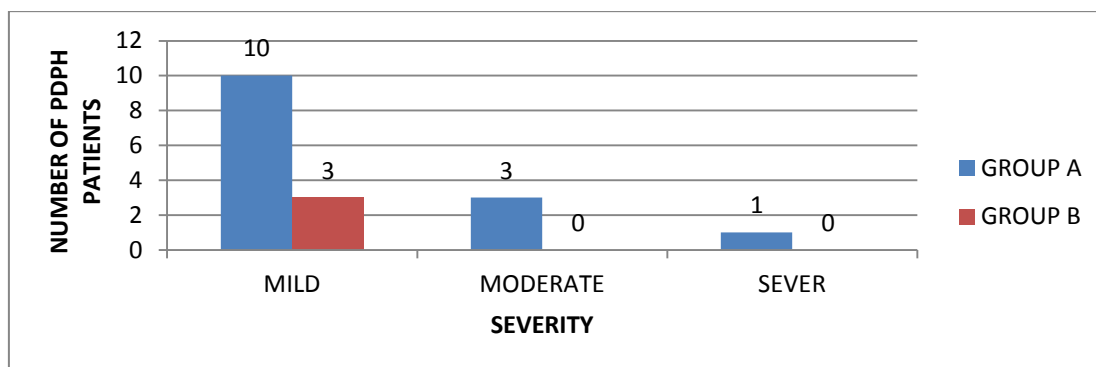


Graph 1: Comparison of incidence of PDPH

3) Comparison of Severity of PDPH

Table 6: Shows Severity of PDPH

SEVERITY ↓	GROUP – A (n=65)		GROUP – B (n=65)	
	NUMBER OF PATIENTS ACCORDING TO SEVERITY (n=14)	%	NUMBER OF PATIENTS ACCORDING TO SEVERITY (n=3)	%
MILD	10	71.4	3	100
MODERATE	3	21.4	0	0
SEVER	1	7.14	0	0

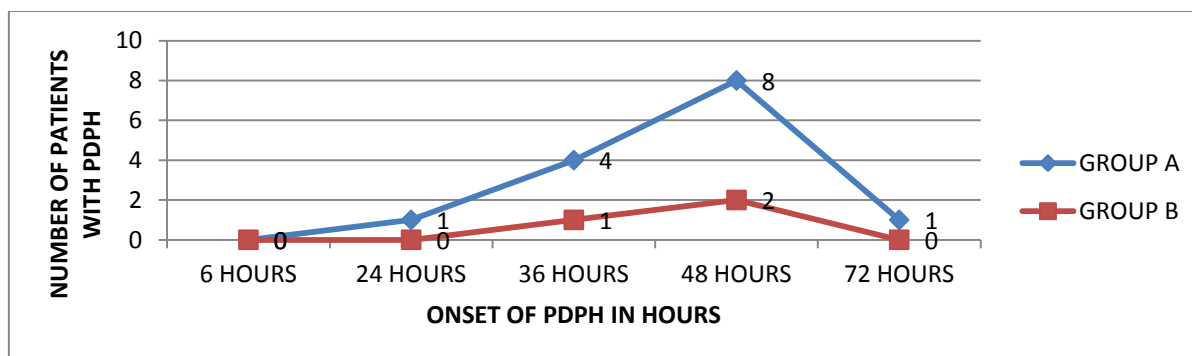


Graph 2: Comparison of severity of PDPH

4) Comparison of Onset of PDPH

Table 7: Onset of PDPH

ONSET IN HOURS ↓	GROUP – A (n=65)		GROUP – B (n=65)	
	NUMBER OF PATIENTS (n=14)	%	NUMBER OF PATIENTS (n=3)	%
6	---	---	---	---
24	1	7.14	---	---
36	4	28.57	1	33.33
48	8	57.14	2	66.66
72	1	7.14	---	---

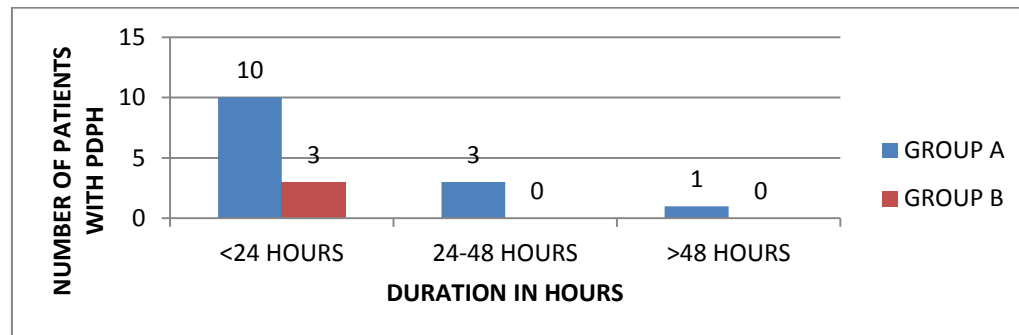


Graph 3: Comparison of onset of PDPH

5) Comparison of Duration of PDPH

Table 8: Shows duration of PDPH

n=130	GROUP – A (n=65)		GROUP – B (n=65)	
DURATION IN HOURS	NUMBER OF PATIENTS (n=14)	%	NUMBER OF PATIENTS (n=3)	%
<24	10	71.42	3	100
24 -48	3	21.42	---	---
>48	1	7.14	---	---



Graph 4: Comparison of duration of PDPH

Discussion

This prospective observational cohort study was done to compare the incidence of PDPH following spinal anaesthesia through 25G and 27G Quincke spinal needles for lower abdominal surgeries posted at Katihar Medical College & Hospital.

A total of 130 patients between 25-50 years of age group belonging to ASA- I & II were selected into two groups i.e., Group A (25G Quincke needle) and Group B (27G Quincke needle).

Spinal anaesthesia was administered in sitting position at L₂-L₃ or L₃-L₄ interspace through either 25G or 27G Quincke spinal needles. About 3.5 ml Bupivacaine[®] heavy was injected intrathecally.

Incidence, onset, duration and severity of PDPH were noted as primary assessment following spinal anaesthesia up to 5 days.

The demographic data with respect to age, sex and ASA grade were comparable among the two groups with no statistical difference (P>0.05).

We choose adult of either sexes aged between 25 to 50 years undergoing lower abdominal surgeries only to exclude maximum biases due to selection of patients and surgeries and to confirm uniformity. The types of surgical cases performed were also similar, with similar times for anaesthesia and surgery in both the groups.

In our study there were no serious adverse effects in any of the patients between the two groups who received Bupivacaine heavy. This was similar to findings by all the studies done previously with this preparation.

Lower abdominal surgeries performed under spinal anaesthesia are less hazardous than general anaesthesia. Nowadays it is a common and acceptable anaesthetic practice throughout the world. Headache after dural puncture is a complication of spinal anaesthesia and is believed to result from leakage of CSF both at the time of dural puncture and probably more important due to continuous leak afterwards.⁹ Post dural puncture headache is a complication that should not be treated lightly. There is potential considerable morbidity due to post dural puncture headache and there are reports of PDPH symptoms lasting for months or years¹⁰. Untreated PDPH may lead to subdural haematoma¹¹ and even death may occur following bilateral subdural haematoma.¹² Therefore anaesthesiologists are advised to prevent PDPH by optimizing the controllable factors like spinal needles size as well as shape while conducting spinal anaesthesia. Obstetric patients are at high risk of PDPH than non-obstetric females under 40 years of age¹³. Indeed,

the highest incidence of PDPH is in the parturient and may partly explain higher incidence of PDPH in females as a whole.¹⁴

Diagnosis of postdural puncture headache depends upon the body position; the pain is aggravated by sitting or standing and relieved or decreased by lying down flat.¹⁵

Apart from other factors, post dural puncture headache is related to the size as well as the type of spinal needle used^{5,6}. It is progressively reduced with the use of smaller size spinal needles¹⁶. Pencil point needles produce less damage to the dural fibres and allow the hole to close more readily. Thus they have a lower incidence of post dural puncture headache than cutting needle tip designs¹⁷.

The overall incidence of post dural puncture headache ranges from 0% to 37% as reported by various authors. Reported frequency of PDPH ranges from 4%¹⁸ to 40%¹⁹ with Quincke spinal needle used in young females. Ross et al reported PDPH in 9% of patients. In the study by Roheena and Colleagues, severity of PDPH was from mild to moderate. None of the patients complained of severe PDPH. It was more on 1st post operative day and gradually decreased on the subsequent days.

Incidence of PDPH with 27 gauge Quincke needle ranges from 1.1%²⁰ to 12.8%. However, in a recent study by Muhammad et al frequency of PDPH was 0% with 27G Quincke spinal needle when spinal anaesthesia was administered for caesarean section.

In a study by Viitanen et al, PDPH incidence was 8.5%. It was mild in 4%, moderate in 3% and severe in 1% of patients. Symptoms started on first or second day after spinal injection and lasted for 3 days.

In our randomized study, the incidence of PDPH was 21.5% with 25G quincke needle and 4.6% with 27G Quincke needle. There was no severe PDPH in either of the group our study, therefore, clearly demonstrated a significant reduction in incidence of PDPH when smaller size Quincke needle was used as compare to larger ones. In a

study by Landau et al, incidence of PDPH with 27G whit acre needle was less than 1%. However a study by Shah and colleagues which closely resembles our study, demonstrated PDPH incidence was 20% with 25 G Quincke needle and 12.5% with 27 G Quincke needle

Conclusion

Post Dural Puncture Headache (PDPH) is a well known complication following spinal Anaesthesia since its first case report. The two principal determinant factors for development of PDPH are the type and the size of the spinal needles.

It can be concluded from our study, large bore cutting type of spinal needle(25G Quincke), produces more PDPH than small bore cutting type of spinal needle (27G Quincke).

Therefore we recommend routine use of smaller size Quincke needle (27G) while performing spinal anaesthesia in patients between 25- 50 years of age group posted for lower abdominal Surgeries.

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