

Original Article

Post Dural Puncture Headache(PDPH) after spinal anesthesia for caesarean section(CS) – A comparative study with 25G and 27G Quincke spinal needle

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Abstract:

Aim : *Post dural puncture headache(PDPH) is one of the most common complication after subarachnoid block (SAB). Several factors contribute to the development of PDPH. It includes needle size, type of needle, direction of the bevel side, number of attempt, CSF loss, age and weight of the patient. The aim of the study was to assess the incidence and risk of PDPH after subarachnoid block(SAB) in caesarean section(CS).*

Method : *The study was designed as prospective with random sampling method. 126 patients were included in this study after exclusion criteria. Pulse, BP, SPO2 and other minor complications were observed. PDPH was followed for 3 days in post-operative period. Data was analyzed statistically.*

Result : *One hundred and twenty-six patients were included in this study of which 11.11% developed post dural puncture headache (PDPH). 25G quincke needle developed 14.27% and 27G quincke needle developed 7.9%.*

Conclusion : *The study showed that small bore quincke needle (27G) frequency of PDPH is less than that of large bore 25G quincke needle. Frequent attempt and loss of CSF are also responsible for development of PDPH in spinal anesthesia.*

Key Words : *Spinal needle, PDPH, Subarachnoid block, Quincke needle.*

(JBAS 2023; 36 (1) : 22-27)

Introduction

The history of spinal anesthesia started from the late 1800 century. Then it was done to reduce intracranial pressure by aspirating cerebro spinal fluid due to tuberculous meningitis¹. It was practiced by Wynter and Quincke. John Conning also practiced spinal anesthesia using cocaine. August Bier in 1898 performed spinal anesthesia using 10-15 mg of cocaine. He used it in nine patients and four of them developed PDPH².

Spinal anesthesia is widely practiced for surgery bellow umbilicus. Now-a-days caesarean delivery

is widely practiced worldwide. General anesthesia for caesarean section is associated with greater maternal risk. Epidural anesthesia is also widely practiced but there may be chance of patchy block, total spinal anesthesia. Spinal anesthesia is simple, rapid and produce excellent operative condition³. PDPH is a complication of spinal anesthesia and occurs from puncture of the dura matter. Due to loss of CSF in the epidural space causes traction on the cranial contents and reflex vasodilatation⁴. Main factors for the frequency and severity of spinal headache depends on size of the needle and tip of the needle.

The CSF leakage and incidence of PDPH can be reduced by using small bore needle and to avoid multiple puncture. Proper hydration and bed rest post-operatively is a helpful method for PDPH management.

The aim of the study was to compare the incidence of PDPH in obstetric patient after caesarean section using 25G Quincke and 27G Quincke spinal needle.

Materials and Method

The study was done in Bangladesh Institute of Health Science(BIHS) General Hospital, Darussalam, Mirpur, Dhaka-1216. The study period was September 2021 to May 2022. Total study population was 126. All the patients were ASA grade 1 and 2. They were both primi and multipara. The age range was 20 to 42 years. Weight range was 60 to 109 kg. It was a prospective randomized single blind study.

After proper counselling and informed consent, the above mentioned 126 parturient underwent caesarean deliveries by spinal anesthesia were included. Those who suffer from severe PIH, Hypovolemia, Coagulopathy, raised ICP, Vertebral anomaly and infection at the site of injection were excluded. The parturient were divided into two groups – Group-I and Group-II. After proper assessment and history taking they were brought to operation theatre. Patient were in supine position with a wedge below right buttock an intravenous line established with 20G or 18G I.V. cannula inj. Ondansetron and inj. Omeprazole are injected to avoid vomiting and aspiration. All the patients were preloaded with Ringer's lactated solution by 10ml per kg. Standard monitors like pulse oximeter, ECG and NIBP were applied. The patients were placed in sitting position during spinal anesthesia. After all, aseptic precautions we used 25G Quincke spinal needle in Group-I and 27G spinal needle in group-II. The needle was introduced in midline and the bevel of the needle directed laterally at the level of L3-4 space. After free flow of CSF, 2.5 ml of 5% hyperbaric bupivacaine injected intrathecally. The patients were placed in supine position immediately after spinal anesthesia. Left lateral tilt was maintained and supplemental oxygen supplied through face mask at 4-5 liters per minute. Vital parameters were assessed during surgery and if any problem, treated immediately.

Maternal blood pressure was measured by automatic NIBP monitoring at one-minute

interval for the first five minutes. Then five minutes' interval up to the end of the surgery and also to the recovery room. When the systolic blood pressure decreases below 20% of the baseline level then treated by inj. Ephedrine hydrochloride and I.V. fluid as required.

Patients were visited on the 1st, 2nd, and 3rd post-operative day. They were interviewed about headache, backache or stiffing of the neck or examine about cranial nerve palsy. PDPH was defined as headache which worsen on sitting and relieved by lying flat within first 5 post-operative days. The headache may be frontal, occipital or occipito-frontal. The PDPH may be classified as mild, moderate and severe. Mild and moderate pain can be managed by conservative treatment. But severe pain is difficult to manage. It may need epidural normal saline injection or blood patch with oral or I/V hydration.

Results

We studied 126 patients of ASA 1 and 2 aged 20-42 years. Majority of the patients were 20-30 years undergoing caesarean section under spinal anesthesia using 25G Quincke (n=63) Group-I and 27G Quincke(n=63) Group-II. Demographic data of them are shown in table -1. Age, weight, gravida ASA, physical status of two groups are shown within comparison. Fourteen patients out of 126 patients developed PDPH (11.11%). In Group-I out of 63 patients 9 (14.28%) patients developed PDPH in Group-II (n=63) 5(7.94%) patients developed PDPH.

Table -1: Demographic Data

	Group – I 25G Quincke n = 63	Group – II 27 G Quincke n = 63	P value
Age in years Means ± SD	28.82 ± 4	29.26 ± 4.66	>0.05
Weight in Kg Means ± SD	73.53 ± 10.32	73.80 ± 89	>0.05
Gravida	Primi: 44 (68.25%) Multi:20 (31.74%)	Primi: 40 (63.49%) Multi:23 (36.50%)	>0.05
ASA physical status	ASA – 1 45(71.42%) ASA – 2 18 (28.57%)	ASA – 1 43(68.25%) ASA-2 20(31.79%)	>0.05

Table -2: Frequency of PDPH

PDPH	Group – I n = 63 25G Quincke	Group – II n = 63 27 G Quincke	P value
Present	9 (14.28%)	5(7.94%)	>0.05
Absent	54(85.7%)	58(92.06%)	

The PDPH was mild and moderate type. No patient in both groups developed severe PDPH. The PDPH was managed by rest, oral and I.V fluid with mild analgesic and caffeine. Blood patch was not needed in any patient.

Table – 3 Severity of PDPH

PDPH	Group – I n = 63 25G Quincke	Group – II n = 63 27 G Quincke	P value
Mild	5(7.9%)	4(6.34%)	NS
Moderate	4(6.34%)	1(1.58%)	
Severe	0	0	

Table 4 Demographic data of PDPH Positive Patient.

Age in ± SD	Group – I n = 63 25G Quincke	Group – II n = 63 27 G Quincke	P value
	25.88 ± 3.44	25.22 ± 1.6	NS
Weight in KG ± SD	65.77 ± 4.14	67 ± 6.40	
Parity	6 primi 3 Multi 66.66% 33.33%	3 primi 2 Multi 33.33% 40%	

Table – 5 Onset of PDPH

PDPH	Group – I n = 63 25G Quincke	Group – II n = 63 27 G Quincke	P value
Post-operative day			
1 st POD	2(3.1%)	1(1.58%)	>0.05
2 nd POD	6(9.53%)	4(6.3%)	
3 rd POD	1(1.56%)	0	

The mean age of patients (n=126) was 28.67 minimum was 20 years and maximum was 42 years. Of 126 patients 83(63.87%) were primipara and 43(34.12%) was multipara. The mean weight of the patients 73.67 Kg ranging 56-105 Kg.

In Table-4 the PDPH positive patients average age in Group-I is 25.88 and Group-II is 25.22. Positive 9 patient 25G needle and primipara 6 and multipara 3 and Group-II PDPH positive 5 patients of them primipara 4 and multipara 1.

Severity of PDPH and onset of PDPH in post-operative day shown in table-3 and 5.

Discussion

One of the common complications of spinal anesthesia is Post Dural Puncture Headache (PDPH)¹⁶. General anesthesia for CS may minimize headache but it is associated with various complications and risk of maternal morbidity and mortality. Now-a -days the choice of anesthesia for CS is spinal anesthesia. Spinal anesthesia has many advantages for operation of obstetric patient. The block is reliable, quick, technique is reliable, minimal instrument needed. It causes less bleeding, good muscle relaxation and contracted gut. The mother remains awake during delivery and can receive the new born. So many hazards of general anesthesia can be avoided. With so many advantages in spinal block but it is associated with PDPH. There are various factors for PDPH like needle size, multiple dural puncture, needle shape and CSF leakage.

We studied 126 obstetric patients using 25G and 27G Quincke spinal needle. The patients were divided into two groups, Group-I(n=63) using 25G Quincke needle and Group-II(n=63) using 27G Quincke needle. We observed the patients for

development of PDPH up to 3rd post-operative day. The overall PDPH in 126 patients is 11.11%. In Group-I 14.28% developed PDPH and in Group-II 7.4% patient developed PDPH. Numerically the number is greater in Group-I than in Group-II. It is not statistically significant. Onset of PDPH was mostly on the second day and it was mild to moderate type ¹³.

Frequency of PDPH reported by various study ranges from 4% to 40% using 25G Quincke needle and 27G Quincke spinal needle.

Alam MR. et.al. reported frequency of PDPH ranges from 0.3 – 20% and headache is self-limiting and resolve in simple measure ¹.

Ali Sharfaraz Siddique et al. reported 8.7% PDPH using 25G Quincke needle ⁵.

Ahmed Ghaleb stated that PDPH can be managed by noninvasive treat such as bed rest fluids, analgesics, caffeine, and sumatriptan. Epidural blood patch is rarely needed but most treatment in severe headache ⁶.

Bedilu Girma Wejl, Mohammaed Suleiman Obsa, Kidest Getu Melese and Gedion Asnake Azeze stated that needle size is the most important reason for developing PDPH. The smaller the needle diameter the incidence of PDPH will be more reduced. But very thin spinal needle may cause technical difficulties and multiple dural punctures and a high incidence of PDPH ⁷.

Shah et.al. Reported 20% frequency of PDPH using 25G quincke spinal needle ⁸.

Buettner J. et.al. studied 200 patients using 25G Quincke and reported 8.5% PDPH and Devic et.al. 7.1% ^{11 22}.

H.Epathen et.al studied 148 patient and reported 8.1% PDPH. They also studied by 25G Whitacre and 27G Whitacre spinal needle. They reported PDPH was 0.5% to 3.1%.

Fauzia B. et.al. reported use of fentanyl with hyperbaric bupivacaine for spinal anesthesia causes rapid block but does not reduce the incidence of PDPH ^{10 11}.

Dr. Ataur Rahman et.al. studied 120 patients using 25G and 27G Quincke spinal needle. In 25G Quincke group frequency of PDPH was 26% and in 27G Quincke Group-I0% ¹².

Ghulam Murtaza et.al. reported using 25G and 27G pencil point spinal needle as PDPH was 0% in both groups but non PDPH was 8% and 12% respectively in two groups ¹³.

Tariq et al. Mentioned that frequency of PDPH

decreases with the size of the needle ¹⁴.

Ahmed et al reported that PDPH is common after caesarean section under spinal anesthesia. It is about 32% and depends on the size of the needle and tear of the dura. It can be managed with bed rest, hydration and analgesic ¹⁵.

Crawford – 1981 reported incidence of PDPH of 77.5% with 18G needle and 0% with a 29G needle. So using very thin and pencil point needle for spinal anesthesia may reduce the incidence of PDPH significantly.

Various studies done with 25G and 27G Quincke spinal needle and also by 25G and 27G Whitacre spinal needle. Results shows that the Whitacre needle causes less PDPH than Quincke needle ^{16 17}.

Jan Muhammad Shaikh et.al. reported 8.3% PDPH with 25G Quincke needle and 3.7% with 27G Quincke spinal needle ¹⁸.

Ross et.al reported overall 9.6% PDPH and the PDPH decreases with the decrease of the size of the needle. Rohcena and colleagues reported nearly same the result ¹⁹.

Parmar et al. using 25G Quincke spinal needle reported 2% of PDPH ²⁰.

Regarding 25G Quincke needle Meyer et.al studied 147 patients and reported 2.5% PDPH ²¹.

Zafurullah et al. reported 14% frequency of PDPH using 25G Quincke spinal needle.

J Lynch, 1 Krings, Erust, K. Strik, K. Topalidis, H.Schaaf and M.Fiebig stated that many factors are responsible for influencing the incidence of PDPH. The most important is needle size. Similar documents are mentioned by Gerard et al. and Sarma VJ et al ²³.

Pawan Puspa Baral et al. stated that the incidence of PDPH depends on the size of the spinal needle. It decreases with the use of thinner spinal needle. They studied PDPH by using 27G Quincke and 27G Whitacre spinal needle. They showed that 27G quincke developed 33% more than 27G Whitacre ²⁴.

Roumiana Batova, Silvi Georgiev stated that the needle tip correlates with a lower incidence of PDPH. Atraucan design tip causes less PDPH than Quincke design needle ²⁵.

In our randomized study the frequency of PDPH overall 11.11% and 25G Quincke 14.28% and 27G Quincke 7.4% which is related to the results reported by various authors.

In this study it was seen that the incidence of PDPH almost absent elderly patients (>35

years). Parity and weight of the patients not related. It

was seen that the overall PDPH is more in thin person than obese patient.

Severity and frequency of PDPH depend upon the various size and type of needle. Several study was done with various needle with comparisons. The different needles did not differ much with the variable parameters. In 25G Quincke needle the number of PDPH is more than 27G Quincke needle, 25G Quincke needle easy to introduce and less time required to get the CSF.

Conclusion

The 25G Quincke and 27G Quincke needle can be used safely in spinal anesthesia. But overall frequency of PDPH is more in wide bore needle. Though it is not statistically significant we should use smaller bore needle to avoid PDPH. Smaller needle may need multiple puncture and more time required to get CSF. Smaller bore needle is better than wider bore needle.

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