Original Article

Post dural puncture headache following subarachnoid block for caesarean section: A comparision between 25G and 27G Quincke spinal needle

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Abstract

Background *Post Dural puncture headache is an iatrogenic complication following subarachnoid block. Fine gauge spinal needle especially 27G though requiring technical expertise to use, probably represents the optimum needle for SAB in respect to frequency and severity of PDPH.*

Objective *To compare the frequency and severity of post Dural puncture headache in obstetric patients using 25G and 27G Quincke spinal needle.*

Methods *Forty full term parturient aged between 18-45 years, with ASA physical status I &II underwent elective Caesarean section under SAB were randomly divided into two groups. Anesthetic technique was standardized using 1.5-2.0 ml 0.5% hyperbaric bupivacaine at L3-4 interspace.Frequency and severity of post dural puncture headache (PDPH) were recorded. Data were analyzed using SPSS program.*

Results *Frequency of PDPH following the use of 25G Quincke (Group I) and 27G Quincke (Group II) spinal needs was 20% (4/20) and 0% (0/20) respectively. All PDPH in Group I was moderate in type and no severe PDPH developed in any Group. Most of the patients with PDPH developed it on 1st and 2nd post-operative day.*

Conclusion: *when using a 27G Quincke spinal needle, the frequency and severity of PDPH was significantly lower than when a 25G Quincke spinal needle was used.*

Key words *SAB, PDPH, 25G & 27G QSN*

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Introduction

General anesthesia for Caesarean section is associated with relatively greater maternal risk than regional anesthesia. Spinal anesthesia has therefore become more widely practiced anesthetic technique in Caesarean delivery. It is simple to institute, rapid in its effect and produces excellent operating conditions.[1]It also avoids fetal as well as maternal risks of general anesthesia, requires minimum postoperative anesthesia care and provides adequate postoperative analgesia.[2]

Post dural puncture headache (PDPH) is an complication of SAB and results from puncture of the duramater. The signs and symptoms of PDPH results from loss of cerebrospinal fluid, traction on the cranial contents, and reflex cerebral vasodilatation.[3]Two most important factors influencing the frequency and severity of PDPH are the patient's age and the size of the dural perforation.[4] The parturient is at particular risk of PDPH because of her sex and young age.[5] Fine gauge spinal needles, 29G or smaller, are technically more difficult to use, and are associated with a high failure rate for SAB.[6] 25G, 26G and 27G needles probably represent the optimum needle for SAB regarding frequency and severity of PDPH .[7]

The aim of this study was to compare the frequency and severity of PDPH in obstetric patients undergoing Caesarean section under SAB with

different size spinal needles: 25G Quincke and 27G size Quincke spinal needle.

Methods

This prospective, randomized study was undertaken in obstetric units of BIRDEM General Hospital. The patients were selected randomly. The randomization was double blind except for the anesthetist performing spinal block. Patient surgeon and the assessor in the ward did not know which spinal needle was used. Study was approved by the institutional ethics committee. Written informed consent was obtained from each patient. Forty full term parturient aged between 18-45 years, with ASA physical status I &II underwent elective caesarean section under SAB were randomly divided into two groups. Uncomplicated pregnancy and normal fetal heart rate at the time of surgery were mandatory inclusion criteria. The exclusion criteria were: patient refusal, contraindication to spinal anesthesia for infections, hemodynamic, hemostatic or neurological reasons, emergency Caesarean section, severe pre-eclampsia or failure of spinal anesthesia.

All patients fasted for 6-8 hours and received ranitidine 150 mg orally on the morning of surgery. On arrival in the operation theatre, patients were positioned supine with left lateral displacement of 20^0 by putting a wedge under the right hip. A 3-lead ECG monitor, pulse oximeter and an automated non-invasive blood pressure monitor were applied. A fluid preload of crystalloid solusion15-20 ml/kg body weight was administered via 18G intravenous cannula over a period of 10-15 minutes before proceeding for spinal anesthesia. Spinal anesthesia was performed with the patient in sitting position after disinfection with povidone iodine. Spinal needle was inserted through the L3-4 interspace.

After return of clear cerebrospinal fluid, hyperbaric bupivacaine 0.5%, 7.5-10 mg (1.5-2.0 ml) was injected over 10-20 seconds, through either a 25G Quincke (Group I) or a27GQuincke (Group II)spinal needle. The bevel of the spinal needles was kept parallel to the sagittal plane to prevent cutting of the dural fibers. Patients were then positioned supine with wedge under the right hip, and O_2 was given at a rate of 2 liters/min via a facemask. Numbers of attempts at subarachnoid block were limited to one. Patients with more than one attempt were excluded from the study.

ECG and oxygen saturation were monitored continuously, and arterial pressure was measured every 3-minutes during surgery and every 15-minutes during immediate postoperative period. If patient developed hypotension, it was managed by intravenous crystalloids and/or colloids. Hypotension associated with bradycardia was managed with intravenous atropine and crystalloids or colloids. In case of refractory hypotension, injection ephedrine was used in 5-10 mg boluses.

Postoperatively, all patients were assessed daily for 4-days by an investigator, blinded to the size of needle used. PDPH was defined as a headache aggravated by assuming upright position and relived in the supine position. Other types of headache were considered as non-specific and were not included in PDPH category. Severity of PDPH was graded as mild, moderate and severe and was classified according to the criteria listed in table I.

Statistical analysis was performed using SPSS program. Quantitive variables were expressed as Mean ± SD (standard deviation) with qualitative variables were expressed as percentage. PDPH was analyzed using student's t test and chi-square test. A p-value <0.05 was considered significant.

Treatment of PDPH included bed rest, enhanced fluid intake, analgesics and caffeine and avoidance of straining. None of the patients required epidural blood patch, which is the definitive treatment in refractory cases.

Results

Patients received SAB using 27G Quincke spinal needle had a statistically significant less PDPH (p = 0.035) compared with those received 25G Quincke spinal needle. Moreover patients who suffered from PDPH in Group I (25G Quincke needle) was moderate in nature and were managed with conservative treatment without the requirement of epidural blood patch. There were no significant difference between two groups in respect to hemodynamic variables or side effect intraoperatively.

Table I *Grading of PDPH severity*[8]

Mild	No limitation of activity
	No treatment required
Moderate	Limited activity
	Regular analgesics required
Severe	Confined to bedAnorexia
	Unable to feed baby

Table II *Demographic data*

	Group I25 G Quincke	Group II27 G Quincke	p-value
Age (yrs) Means ± SD	25.8±5.60	26.4±5.86	0.340
Weight (kg) Means ± SD	60.0±8.36	61.7±8.45	0.165
Parity Primipara	8 (40%)	9 (45%)	0.808
Multipara	12 (60%)	11(55%)	0.835
Physical status ASA I	9 (45%)	8 (40%)	0.808
ASA II	11 (55%)	12 (60%)	0.835

Values are expressed in mean ± SD.The value is significant if p<0.05
ASA I = A normal healthy patient
ASA II = A patient with mild systemic disease with no functional limitation

Table III *Frequency of PDPH*

PDPH	Group I (n=20) 25G Quinckeneedle(%)	Group II (n=20) 27G Quinckeneedle(%)	p-value
Present	4 (20%)	0 (0%)	0.035
Absent	16 (80%)	20 (100%)	

The value is significant if p< 0.05

Table IV *Grading of PDPH*

PDPH	Group I (n=20) 25G Quinckeneedle(%)	Group II (n=20) 27G Quinckeneedle(%)
Mild	0	0
Moderate	4(20%)	0

Table V *Onset of PDPH*

Onset (POD)	25G Quincke needle (%) (n=20)	27G Quinckeneedl (%)(n=20)
1st POD	1(5%)	0
2nd POD	3(15%)	0
3rd POD	0	0

POD= Postoperative day

Discussion

General anesthesia for Caesarean section is associated with an increased incidence of maternal mortality.[9] It is therefore a popular practice to use regional anesthesia wherever possible.[10]

Headache after dural puncture is a complication of spinal anesthesia and is believed to result from leakage of CSF both at the time of dural puncture and probably more importantly, continuing leak afterwards.[11]Post dural puncture headache is a complication that should not be taken lightly. There is a potential for considerable morbidity due to postdural puncture headache[12] and there are reports of PDPH symptoms lasting for months or years[13],untreated PDPH leading to subdural hematoma[14,] and even death from bilateral subdural hematomas.[15] Therefore anesthesiologists are advised to prevent PDPH by optimizing the controllable factors like spinal needle size as well as shape while conducting spinal anesthesia.[16]Obstetric patients are at high risk of PDPH being female and under 40 years of age.[17] Indeed, the highest incidence of PDPH is in the parturient and may partly explain the higher incidence of PDPH in females as a whole.[18]

Diagnosis of dural puncture headache depends upon its association with body position; the pain is aggravated by sitting or standing and relieved or decreased by lying down flat.[19]

Apart from other factors, post dural puncture headache is related to the size as well as the type of the spinal needle used.[20] It is progressively reduced with the use of thinner Quincke type spinal needles.[21] The overall incidence of post dural puncture headache ranges from 0% to 37% as reported by various authers.[22]

Reported incidence of PDPH ranges from 4%[23] to 40%[24] when 25G Quincke spinal needle is used in young female patients. Incidence of PDPH with 27G Quincke needle ranges from 1.1%[25] to 12.8%[26.] In the study by Roheena andcolleagues[25,] severity of PDPH was ranges from mild to moderate. None of the patient complained of severe PDPH. It was more on the 1st and 2nd postoperative day and gradually decreased on the subsequent days.

In our randomized study, the frequency of PDPH was 20% with 25G needle, 0% with 27G needle and was moderate in all patients PDPH was not

observed in any group. Our study, therefore, clearly demonstrated a significant reduction in frequency of PDPH when 27G Quincke spinal needle was used. In a recent study by Muhammad *et al*[27]frequency of PDPH was 0% with 27G Quincke spinal needle, which closely resemble our study.

Conclusion

Performing subarachnoid block using 27G Quincke spinal needle offers a safe, well tolerated anesthetic technique for caesarean section and has definite advantage over 25G Quincke spinal needle.

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