Frequency of spinal headache among women undergoing caesarean section in Lady Aitchison Hospital, Lahore

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Abstract

Objective: : To determine the frequency of spinal headache in obstetrical patients of different age group in general population

Method: A sample size of 251 pregnant women was calculated and total 255 women fulfilling the selection criteria were enrolled. All the patients underwent c-section. Anesthesia was given to all patients at sitting position. The patients received spinal anesthesia at the L2-3 or L3-4 interspaces using a midline technique. The patients received injections of 2.5–3.0 ml of 0.5% isobaric bupivacaine. For three days in a row, the patients were monitored and asked if they had any headaches. Gathered data was entered and analyzed by the SPSS (version 22). Comparison of different factors with spinal headache was done by applying Chi-square test. p-value <0.05 was taken as statistically significant.

Results: Among all the participants, the mean age of the subjects was 32.18±5.5 years. The mean gestational age of the subjects was 37.23±1.04 weeks. The mean gravida was 3.34±1.39. The mean para was 2.01±1.02. The mean abortion was 0.37±0.66. The mean number of attempts was 1.97±0.632. According to spinal needle used distribution, 85(33.3%) were used 27G and 170(66.7%) were used 25G. Among all the participants, 126(49.4%) patients had spinal headache.

Conclusion: We advise against using the 25-gauge Quincke needle in the obstetric population due to the high frequency of headaches and the related treatment requirements. We also know that using small caliber pencil-point needles could further lower the incidence of post-dural puncture headaches, but they are currently very expensive, and many obstetric units in developing nations may not be able to purchase them.

Introduction

The method used to anaesthetize the obstetrical patient undergo the caesarean section either Compared to regional anesthesia (neuraxial block), which is a commonly used procedure during caesarean sections; general anesthesia is linked to a higher maternal risk.

It is simple to insert 25G or 27G non-cutting (a-traumatic) needle is subarachnoid space by piercing the dural and arachnoid layer of meninges containing CSF at the level of L3-L4, L4-L5 intervertebral space.[1]

By this technique we can achieve rapid onset in its effect, and provide excellent operating condition. It also avoids fetal and maternal risk of general anesthesia, minimize the postoperative care. Beside all other complication of spinal anesthesia such as hypotension (vasodilation) Tachycardia, (Sympathetic activation) nausea, tinnitus, photophobia, spinal (PDPH) is major and serious complication in obstetrical patient related with different age group.[1]

A serious side effect of neuraxial anesthesia, spinal headaches can occur in people of all ages, although they are particularly common in women after spinal anesthesia. Obstetric patients are at high risk for spinal headache because of their sex. Other factors that promote spinal headache are the young age, pregnancy, vaginal delivery, low BMI and use of neuraxial blocks either with 25G or 27G spinal needles.[1-2]

Although PDPH usually goes away on its own, it can nevertheless have a serious negative impact on obstetric patients. Additionally, it may prolong the hospital stay and disrupt the mother's regular life if she neglects to care for herself and the newborn. The symptoms of PDPH include reflex cerebral vasodilation, traction on the contents of the cranial nerves, and loss of cerebrospinal fluid. The patient's age and the extent of the dural puncture are the two most significant factors affecting the frequency and severity of PDPH.[2-4]

In the recent era different approaches are used to spinal anesthesia to the positioning of patients to avoid spinal headaches. PDPH shows as a dull hurting pain distributed in a frontal-occipital. Typically, this type of headache got serious by sitting or standing, and when a person lay down the pain reduced. The PDPH is defined by the International Classification of Headache Disorders as a headache that appears five days after a dural puncture and goes away on its own within a week, or up to 48 hours following an epidural blood patch.[5-7]

This type of headache is accompanied by tinnitus, hypoacusis, neck stiffness photophobia, and nausea. In some studies it is mentioned that PDPH take place within 3 days after dural puncture. Inhibiting spinal headache should be the most important goal of clinical practitioner dealing with this population. According to our knowledge there is epidemiological data available in Pakistani population. The main aim of this study is to determine the frequency of spinal headache in pregnant women that will help the clinical practitioner to develop or select best treatment procedure to avoid the headache in pregnant patients after giving birth.[6,8]

Method

This cross-sectional study was conducted at the Department of Obstetrics & Gynecology, Lahore, over a period of three months following the approval of the synopsis. Using a non-probability consecutive sampling technique, a total of 251 pregnant women were selected based on inclusion criteria: women aged 15 to 45 years who underwent spinal anesthesia using 25G or 27G spinal needles and delivered via caesarean section. Women with impaired cognitive ability were excluded. The sample size was calculated using the WHO sample size calculator with a 95% confidence level, an anticipated population proportion of post-dural puncture headache (PDPH) at 42.6%, and a 5% margin of error.

Results

The mean age of the participants was 29.16±6.24 years (18-41). The mean Gravida of the participants was 2.81±1.46 (1-8). The mean para of the participants was 1.55±1.16 (0-5). Out of 255 participants, 03 (1.2%) had spinal deformity while 252 (98.8%) had no spinal deformity. Out of 255 participants 255 (100%) were not had head trauma. Among all participants 85 (33.3%) were those had used 27 G needle while 170 (66.7%) were those had used 25G spinal needle. Out of 255 participants 126 (49.4%) were with single attempt, 106 (41.5%) were with double attempt while 23 (9.0%)

were with triple attempt. Out of 255 participants 127 (49.8%) were had spinal headache associated nausea, 127 (49.8%) were having spinal headache associate neck stiffness, 123 (48.2%) were having tinnitus, 107 (42.0%) had photophobia and 56 (22.0%) had hypo-acusia.

It was found that those people who have history of diabetes 84.4% developed spinal headache as compare to 41.9% of those who were without diabetes (p<0.001). It was found that those people who have H/O hypertension 71.4% developed spinal headache as compare to 45.1% of those who were without hypertension (p=0.002). It was found that those people who have H/O IHD (ischemic heart disease) 100% developed spinal headache as compare to 49% of those who were without IHD (p=0.243). It was found that those people who have H/O preeclampsia 68.4% developed spinal headache as compare to 46.1% of those who were without preeclampsia (p=0.011). It was found that those people who have H/O eclampsia 85.7% developed spinal headache as compare to 48.4% of those who were without eclampsia (p=0.064) It was found that those people who have H/O migraine 56.1% developed spinal headache as compare to 47.5% of those without migraine (p=0.249). It was found that those people who have H/O spinal deformity 66.7% developed spinal headache as compare to 49.2% of those who were without spinal deformity (p=0.619). It was found that those people who developed spinal headache within 3 days were 99.2% as compare to 1.5% of those who were not developed within 3 days (p<0.001). It was found that those people developed spinal headache more than 3 days were 96.8% as compare to 42.9% who were not developed spinal headache more than 3 days (p<0.001). Table 1

It was found that those people with neck stiffness developed spinal headache were 99.2% as compare to nil of those who were without neck stiffness (p<0.001). It was found that those people with tinnitus developed spinal headache were 99.2% as compare to 3.0% of those who were without tinnitus (p<0.001). It was found that those people with photophobia developed spinal headache were 99.1% as compare to 13.5% of those who were without photophobia (p<0.001). It was found that those people with hypoacusis developed spinal headache were 98.2% as compare to 35.7% of those who were without hypoacusis (p<0.001). Table 2

The mean age of those who developed spinal headache was 32.18±5.56 years as compare to 26.21±5.702 years of those who did not developed spinal headache (p<0.001). The mean gravida of those who developed spinal headache was 3.34±1.392 as compare to 2.29±1.343 of those who did not developed spinal headache (p<0.001). The mean para of those who developed spinal headache was 2.01±1.02 as compare to 1.09±1.11 of those who did not developed spinal headache (p<0.001). The mean abortion of those who developed spinal headache was 0.37±0.67 as compare to 0.23±0.57 of those who did not developed spinal headache (p=0.088). The mean gestational age of those who developed spinal headache was 37.33±1.04 as compare to 36.99±1.19 of those who did not developed spinal headache (p=0.017). The mean no. of attempts of those who developed spinal headache was 1.97±0.63 was compare to 1.23±0.42 of those who did not developed spinal headache (p<0.001). Table 3

Table 1: Association of Spinal Headache (PDPH) VS Disease

Variable		Spinal Headache Positive		Spinal Headache Negative		p value	Remarks
		n	%	n	%		
Diabetes	Yes	38	84.4	7	15.6	<0.001	Significant
	No	88	41.9	122	58.1		
Hypertension	Yes	30	71.4	12	28.6	0.002	Significant
	No	96	45.1	117	54.9		
Ischemic heart disease	Yes	2	100.0	0	0.0	0.243	Not significant
	No	124	49.0	129	51.0		
Pre-eclampsia	Yes	26	68.4	12	31.6	0.011	Significant
	No	100	46.1	117	53.9		
Eclampsia	Yes	6	85.7	1	14.3	0.064	Not significant
	No	120	48.4	128	51.6		
Migraine	Yes	32	56.1	25	43.9	0.249	Not significant
	No	94	47.5	104	52.5		
Spinal Deformity	Yes	2	66.7	1	33.3	0.619	Not significant
	No	124	49.2	128	50.8		
Headache Within 3 days	Yes	124	99.2	1	0.8	<0.001	Significant
	No	2	1.5	128	98.5		
Headache More than 3 days	Yes	30	96.8	1	3.2	<0.001	Significant
	No	96	42.9	128	57.1		

Table 2: Association of Spinal Headache (PDPH) VS Related Symptoms

Variable		Spinal Headache Positive		Spinal Headache Negative		p value	Remarks
		n	%	n	%		
Neck Stiffness	Yes	126	99.2	1	0.8	<0.001	Significant
	No	0	0.0	128	100.0		
Tinnitus	Yes	122	99.2	1	0.8	<0.001	Significant
	No	4	3.0	128	97.0		
Photo Phobia	Yes	106	99.1	1	0.9	<0.001	Significant
	No	20	13.5	128	86.5		
Hypoacusis	Yes	55	98.2	1	1.8	<0.001	Significant
	No	71	35.7	128	64.3		

Table 3: Mean Comparison of spinal headache VS Different variables

Variable	Spinal Headache Positive	Spinal Headache Negative	t Test value	p value	Remarks
	Mean± SD	Mean ± SD			
Age (years)	32.18 ± 5.56	26.21 ± 5.70	8.469	<0.001	Significant
Gravida	3.34 ± 1.39	2.29 ± 1.34	6.111	<0.001	Significant
Para	2.01 ± 1.02	1.09 ± 1.11	6.848	<0.001	Significant
Abortion	0.37 ± 0.67	0.23 ± 0.57	1.712	0.008	Significant
Gestational Age	37.33 ± 1.04	36.99 ± 1.19	2.402	0.017	Significant
No. Needle Attempts	1.97 ± 0.63	1.23 ± 0.42	10.894	<0.001	Significant

Discussion

A common invasive procedure for a number of indications, including diagnostic lumbar puncture, spinal anesthesia, myelography, and intrathecal chemotherapy, is the dural puncture. Unintentional dural puncture can happen during epidural anesthesia or analgesia for a variety of causes, such as postoperative and labor pain management, in addition to intentional dural puncture, which happens during spinal anesthesia.

Post-dural puncture headache (PDPH), according to Carrie and Collins, is a headache that develops after a dural puncture and significantly affects the patient's post-operative health. It is characterized by a headache that is not only postural but also lasts longer than 24 hours at any intensity or so intense at any point that the patient is unable to remain upright. [9]

The largest risk category for PDPH is parturition, which is caused by several reasons. Although some studies show a range of 0% to 30%, the generally acknowledged incidence in these patients has been recorded as high as 38%. The risk of PDPH in this patient population may rise as a result of postpartum drops in intra-abdominal and peridural pressure as well as an increase in CSF pressure from bearing down during vaginal birth. [10]

But according to Ravindran et al., bearing down during delivery is not associated with a high incidence. Current practice does not support the idea that pregnancy is a risk factor for PDPH. The frequency of postpartum PDPH in parturients following spinal anesthesia is comparable to that observed in young males and non-pregnant women. [11-12]

The most frequent side effect of treatments that involve puncturing the dura, including diagnostic lumbar punctures, SAB, myelograms, and accidental dural punctures during epidural injections is post-dural puncture hemorrhage (PDPH). The stated frequency varies greatly, ranging from less than 1% to 70%.[13-14]

By using non-cutting (atraumatic) needles with a narrower gauge (24–30G), the risk was significantly decreased to 2% or less. The loss of CSF from a dura defect, which causes intracranial hypotension, is thought to be the main cause of the headache that follows a dural puncture. [15] A large defect makes it possible for more CSF to be lost, which may raise the risk of PDPH and intracranial hypotension. Gravity and a lack of buoyancy from the lower CSF pressure lead the patient's pain-sensitive intracranial veins, meninges, and cranial nerves to be pulled downward as they stand up. This study indicated a 49.8% incidence of PDPH, which is higher than what has been documented in other investigations. Numerous risk variables, including as the needle design, the anesthetists experience, and the research patient age and sex, could be to blame for this. [16-18]

Among 125 patients who had spinal anesthesia, Ahsan et al. discovered a 0% incidence of PDPH. Nafiu and his associates discovered that 8.3% of 96 parturients with SAB had PDPH. Even if Quincke needles were used on all of their patients, this result is still less than that of our investigation. This could be explained by the fact that, in their trial, a consultant anesthetist conducted all of the spinal blocks, whereas in this study, consultants did only 4.1% of the blocks .[16-17] A two-year prospective research by Lubusky et al. found

an incidence of 46.3% in 2003, which is somewhat comparable to our data. However, only 3% of cases were documented in 2004. When Quincke needles were used for 85.2% of the blocks, the former high incidence was achieved.[18] However, the later occurrence was discovered when atraumatic needles were used for 77.8% of the blocks. This has further supported findings from earlier research regarding the decreased rates of PDPH associated with atraumatic needles. [18-20]

The increased incidence seen in this study may have been caused by demographic characteristics that are known to be linked to PDPH risk. Age is a known risk factor, with the biggest risk occurring between the ages of 31 and 45. The age range of our patients falls into this area quite nicely. The female sex, regardless of age, is superimposed on the age factor. Women are about twice as likely as males to develop PDPH. [21-22] According to studies, lateral needle bevel orientation may lower the prevalence of PDPH. More than half of the blocks were completed by junior cadre physicians, with the majority being completed by trainee physicians. There's a chance that the high incidence was caused by the nurses and trainees not observing this procedure.[23]

Conclusion

We advise against using the 25-gauge Quincke needle in the obstetric population due to the high frequency of headaches and the related treatment requirements. We also know that the use of small calibre pencil-point needles (27G) and a minimum number of attempts could further reduce the incidence of post-dural puncture headaches. However, 27G needles are currently very expensive, and many obstetric units in developing countries may not be able to afford them.

References:

1. Olawin AM, M Das J. Spinal Anesthesia. In: StatPearls. StatPearls Publishing, Treasure Island (FL); 2023. Available From: https://europepmc.org/article/NBK/nbk537299 .
2. Kwak K-H. Postdural puncture headache. Korean J Anesthesiol. 2017; 70(2):136-43.
3. Russell R, Laxton C, Lucas D, Niewiarowski J, Scrutton M, Stocks G. Treatment of obstetric post-dural puncture headache. Part 1: conservative and pharmacological management. Int J Obstet Anesth. 2019; 38:93-103.
4. Puthenveettil N, Rajan S, Mohan A, Paul J, Kumar L. Sphenopalatine ganglion block for treatment of post-dural puncture headache in obstetric patients: An observational study. Indian J Anaesth. 2018; 62(12):972.
5. Khanzada AAK, Perchani A, Asgher A, Arshed M, uddin Soomro A, Siddiqui MA. Prevalence of Headache after Dural Puncture using Different Size Quincke Spinal Needles in Participants Undergoing Cesarean Section: A Cross-Sectional Study. Annals Romanian Society Cell Biol. 2022; 26(01):732-41.
6. Amorim JA, Gomes de Barros MV, Valença MM. Post-dural (post-lumbar) puncture headache: risk factors and clinical features. Cephalalgia. 2012; 32(12):916-23.
7. Sargin M, Uluer MS, Tutar MS. The relationship between preoperative and postoperative neutrophil-lymphocyte and platelet-lymphocyte ratio with post-dural-puncture headache in patients undergoing cesarean section. 2019; Annals Med Res. 26(1), 51-5.
8. Lybecker H, Møller JT, May O, Nielsen HK. Incidence and prediction of postdural puncture headache. A prospective study of 1021 spinal anesthesias. Anesthesia and analgesia. 1990; 70(4):389-94.
9. Carrie Less, Collins PD. 29 guage spinal needle. Br J Anesth.1991;66:145-6.
10. Spencer HC. Postdural puncture headache: what matters in technique. Reg Anesth Pain Med. 1998; 23:374-9.
11. Ravindran RS, Viegas OJ, Jasch MD, et al. Bearing down at the time of delivery and the incidence of spinal headache in parturient. Anesth Analg.1981;60:524-26.

12. Sallky KW. Postpartum headache in obstetric anaesthesia by David H Chestnut, 2nd edition. Philadelphia: Mosby, 1999:621-38.

13. Vercauteren MP, Hoffman VH, Mertens E, Sermeus L. Adriaensen HA. Seven-year review of requests for epidural blood patches for headache after dural puncture: Referral patterns and the effectiveness of blood patches. Eur J Anaesthesiol. 1999;16:298-303.

14. Crawford J. Experiences with epidural blood-patch. Anaesthesia 1980;35:513- 515.

15. Carson D, Serpell M. Choosing the best needle for diagnostic lumbar puncture. Neurology. 1996;47:33-7.

16. Ahsan S, Kitchen N, Jenkins C, Margary J. Incidence of Postdural Puncture Headache following Spinal Anaesthesia for Lower Segment Caesarean Section with the 25 Gauge Polymedic Spinal Needle. J Pak Med Assoc. 1996;46:278-81.

17. Nafiu OO, Salam RA, Elegbe EO. Postdural puncture headache in obstetric patients: Experience from a West African teaching hospital. Int J Obstet Anaesth. 2007;16:4-7.

18. L'ubuský M, Berta E, Procházka M, Marek O, Kudela M. Development of incidence of post-dural puncture headache in patients undergoing caesarean section in spinal anaesthesia at the Department of Obstetrics and Gynecology in Olomouc during 2003-2004. Cas Lek Cesk. 2006;145:204-8.

19. Sami HM, Skaredoff MN. In-hospital incidence of post lumber puncture headaches (PLPH) in Caesarean section patients associated with the 22-gauge Whitacre needle. Anesthesiology, 1989; 71:86.

20. Snyder GE, Person DL, Flor CE, Wilden RT. Headache in obstetrical patients; comparison of Whitacre needle versus Quincke needle. Anesthesiology. 1989;71:860.

21. Vilming ST, Schrader H, Monstad I. The significance of age, sex and cerebrospinal fluid pressure in post-lumbar puncture headache. Cephalalgia. 1989; 9:99-106.

22. Kuntz KM, Kokmen E, Stevens JC, Miller P, Offord KP, Ho MM. Post-lumbar puncture headaches: Experience in 501 consecutive procedures, Neurology. 1992; 42:1884-7.

23. Mihic DN. Postspinal headache and relationship of needle bevel to longitudinal dural fibers. Reg Anesth. 1985; 10:76-81.