



Post Dural Puncture Headache after Spinal Anaesthesia and Associated Factors

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Abstract

Post dural puncture headache (PDPH) is a well known complication of spinal anaesthesia. It occurs after spinal anaesthesia induction due to dural and arachnoid puncture and has a significant effect on the patient's postoperative well being. This study was conducted at Mallareddy medical college for women, Hyderabad, Telangana state. This includes 100 patients aged between 20-60 years of both sexes undergoing spinal anaesthesia. Out of 100 patients, 42% of them suffered from PDPH, in those mild, moderate, severe PDPH observed in 31%, 8% and 3% patients respectively. Women after caesarean section were highly affected. PDPH was started on the 1st postoperative day and gradually decreased on the subsequent days it was in the first day 24, in the second day it was in 10 and third day was in 8 patients after spinal injection. In this study 23, 25, 27 Gauge needle were used in which 28%, 10% and 4% patients showed PDPH. The incidence was significantly higher when large bore needles used than smaller needles were used. In this study 11% of patients had post history of PDPH and multiple attempt patients had high incidence of PDPH. Out of 27% obese patients only 2% were suffered from PDPH.

Keywords: Post dural puncture headache, incidence, spinal anaesthesia, risk factors.

Introduction

Spinal anaesthesia is widely practised all over the world for performance of different kind of surgery with minimal complications. It is in practice for centuries and one of its complication is post dural puncture headache (PDPH) which can limit its use^[1,2]

Post-dural puncture headache (PDPH) typically presents as a postural headache that worsens when a patient is in the upright position and lessens to some extent when a patient is in the recumbent position^[3].

PDPH is believed to originate from persistent leakage of cerebrospinal fluid (CSF) greater than the cerebrospinal fluid production after lumbar puncture^[4]. According to the diagnostic criteria of the International Headache Society (IHS) in 2004, the headache can appear up to the fifth day after puncture and disappears spontaneously within a week, or up to 48 hours after an epidural blood patch (EBP) and accompanied by neck stiffness, tinnitus, hypoacusia (partial loss of hearing), photophobia, and nausea^[5].

Different risk factors are considered like characteristics of patient population, characteristics of needle used, puncture technique, number of punctures and many others. The use of spinal needles of smaller gauge have decreased the incidence from 30 % to 0.3%^[6-7].

Women, particularly during pregnancy, are considered at increased risk for PDPH^[1,2,1]. High levels of estrogens in women can influence the tone of the cerebral vessels, thus increasing the vascular distension response to CSF hypotension^[1,8]. It causes distress to patient, increases hospital stay, interferes with new born care in post-partum mother. It is an iatrogenic cause, results after either intentional or accidental dural puncture^[9]. The aim of this study is to know the effect of different factors causing PDPH in patients under -going spinal anaesthesia with lumbar puncture.

Material and Methods

The study includes 100 patients who have undergone their surgical procedure under spinal anaesthesia. Surgical and obstetric Patients coming to teaching and referral hospital were included. The study was conducted after obtaining permission from the hospital ethics commity. ASA GRADE I and II patients who could be operated under spinal anaesthesia aged between 18 to 65 Years of both sexes who were willing to participate included. Patients belonging to ASA GRADE III and IV, contraindicated for spinal anaesthesia like patient's refusal, increased intracranial pressure, bleeding disorder, spinal deformity, hypotension and Patient with history of chronic headache such as migraine, cluster or tension headache were excluded and patients with impaired cognitive ability were also excluded.

Pre anaesthetic check up of all the patients was done. The patients were explained the concept and procedure of this study and their consent for same were taken. Patients were followed up for post dural puncture headache for five days post operatively either in person if still admitted in hospital or by telephone if discharged. Severity and intensity of

headache, onset, duration, associated symptoms like neck stiffness, vomiting were also noted.

Standardised anaesthetic technique was employed for every patient after recording vitals like pulse, blood pressure, SPO2 and a good intravenous access was established. All the patients were preloaded with 500 cc of crystalloid either ringer lactate or 0.9% NaCl.

The block was performed by 23G, 25G&27G Quincke needle either in sitting or lateral position with bevel of needle directed parallel to the long axis of spine with midline approach. After successful attempt and obtaining a free clear flow of CSF local anaesthesia with or without additive was administered. Number of attempts of dural puncture, level of puncture, vital signs (heart rate, blood pressure, oxygen saturation) were noted, before the block performance and after the block till surgery was over.

The patients were identified as having PDPH if Headache develops within three days after dural puncture and a headache that worsens within 15 minutes after sitting or standing and/or improves within 15 minutes after lying. Once patients diagnosed as having PDPH, the severity of his pain was assessed using VAS and NAS (for those who can read and write) or verbal rating scale (for those who can't read or write). All patients who experienced headache were treated by advising them to lie down flat, drink plenty of fluids and coffee, decrease activity and to take 500 mg paracetamol one or two tablets every 8 hourly.

Results

This study was conducted at Mallareddy medical college for women, Hyderabad, Telangana state after obtaining permission from hospital ethics commity. This includes 100 patients aged between 20-60 years of both sexes undergoing spinal anaesthetic surgeries. The incidence of PDPH was recorded in patients and severity grading was done according to Campbell *et al.*, (1993)^[10].

Table 1 Demographic data

Parameter	No/% of patients
ASA I/II	63/37
Male/female	58/32
Age	20-60 years
BMI(Kg/m ²)	25.23±3.52
MAP(mm of Hg)	72.7±3.2
Heart beat/min	88±7
O ₂ saturation	98±2
Level of block	T6-T6
Time to get T4 block in min	5.4±0.4

Table 2: Age wise distribution of patients

Age group	No/% of patients
20-30	52
30-40	20
40-50	16
50-60	14

Table 3: Surgical procedures

Surgical procedure	No /%of patients
Caesarean section	54
Appendicitis	20
Hernia	7
Hydrocele	6
Hysterectomy	9
Haemorrhoides	3
Fistula in ano	1

Table 4: Grading of PDPH severity

Grade	Criteria
Mild	No limitation of activity No treatment required
Moderate	Limited activity Regular analgesics required Convenient treatment required
Severe	Confined to bed Anorexic Unable to feed baby Epidural blood patch required

Table .5: PDPH parameters

S.No	PDPH parameters	No /%of patients
1	<i>Incidence</i>	42
	Mild	33
	Moderate	8
	Severe	1
2	<i>Site of head ache</i>	
	Occipital	12
	Occipito frofal	22
	Frontal	8
3	<i>Associated Symptoms</i>	
	Neck stiffness	1
	Tinnitus	1
	Photophobia	1
	Nausea	39
	None	58

Table 6: Factors effecting PDPH

S.no	Parameter	No /%of patients
1	<i>Previous SA</i>	
	Yes	14
	No	86
2	<i>Previous history of PDPH</i>	
	Yes	11
	No	89
3	<i>No of attempts</i>	
	Single	88
	Multiple	12
4	<i>Position</i>	
	Sitting	12
	Lateral	88
5	<i>Size of SA needles</i>	
	23 Gauge	18
	25 Guage	58
	27 Gauge	24
6	<i>Successful block</i>	
	Yes	96
	No	4
7	<i>Obesity</i>	
	Yes	27
	No	73

Discussion

The PDPH is a complication of spinal anaesthesia and is believed to be results from leakage of CSF both at the time of dural puncture and probably more importantly, continuing leak afterwards^[11]. There are reports of PDPH symptoms lasting for months or years^[12], untreated PDPH leading to subdural hematoma^[13] and even death from bilateral subdural hematomas^[14].

In this study 42% of patients suffered from PDPH, in those mild, moderate, severe PDPH Observed in 31%,8% and 3% patients respectively. The study includes more no of females undergoing caesarean section (54) in those 32 were showed head ache. The incidence of PDPH is highest in young individuals and lean patients^[3,4]. Women who are obese or morbidly obese may have a decreased incidence of PDPH as a result of the increased in intra-abdominal pressure which acts as an abdominal binder helping to seal the defect in the dura and decreasing the loss of CSF^[3].

In the present study the onset of PDPH was started on the 1st postoperative day and gradually decreased on the subsequent days it was in the first day 24, in the second day it was in 10, and third day was in 8 patients after spinal injection, one of the

patients required an epidural blood patch and all symptoms were relieved by conventional means in all patients within three days.

In this study 23,25,27 gauge needle were used for the patients in which 28%,10% and 4% patients showed PDPH. The incidence of PDPH is also directly related to the needle diameter that pierces the Dura mater. The incidence is significantly higher when large bore needles greater than, when smaller needles were used. Although smaller diameter needle punctures used for spinal block decrease the risk of PDPH, these needles are technically difficult to use and are associated with a lower success rate in spinal anaesthesia. Not only the size of the needle affects the incidence of PDPH, but also the type of needle tips. The cutting needle bevels are more common to cause PDPH than the less traumatic pencil point needle bevels. The direction of the needle bevel during insertion also contributes to the occurrence of PDPH. If the bevel of the spinal needle is inserted perpendicular to the fibres of the Dura (which are believed to run longitudinally) an increased incidence of PDPH is expected^[3,4].

The Quincke needle was introduced with bevel in parallel orientation to the long axis of spine as this has been found to decrease the incidence of PDPH^[15].

In our study spinal anaesthesia was given in lateral (88%) and sitting (12%) position and PDPH was observed less in lateral positioned people. Another study done by Siamak Afshin Majd, et al^[16] where lumbar puncture was done for diagnostic purpose in sitting and lateral position by 21 gauge Quincke needle observed more PDPH in sitting position (45 %) than in lateral position 16.6%.

In this study 11% of patients had history of PDPH. Patients with previous history of PDPH have a significantly more probability of developing PDPH on the subsequent lumbar punctures. Repeated Dural puncture due to inexperience of the procedure performer or technical difficulty also increases the chance of PDPH on patients^[17].

In this study 12 patients had multiple attempts, in which about 9 patients had PDPH. Patients for

whom SA was successful at the first attempt were less likely to develop PDPH than those patients for whom attempt was repeated. This could be due to as the number of attempt increase the probability of piercing the Dura matter repeatedly will increase, which increases the volume of CSF leak, thereby increasing the probability of development of CSF hypotension & PDPH. This finding in lines with findings of different studies^[3,4,18].

In our study there are 27 obese patients in which only 2 patients expressed PDPH. People Lower Body mass index (BMI) has been shown to be associated with higher risk of PSPH. Ironically, PDPH incidence is noted to be low in morbid obesity. This may be because of the large abdominal panniculus acting like an abdominal binder and raising the intra-abdominal pressure, thus, reducing the rate of leak of CSF through the dural defect^[19].

This study concludes that 42% of patients suffered from PDPH, in those mild, moderate, severe PDPH Observed in 31%,8% and 3% patients respectively. Women after caesarean section were highly affected. PDPH was started on the 1st postoperative day and gradually decreased on the subsequent days it was in the first day (24), in the second day it was (10) and third day was (8) after spinal injection. The incidence was significantly higher when large bore needles greater than, when smaller needles were used. In this study 11% of patients had post history of PDPH and multiple attempt patients had high incidence of PDPH.

References

1. Cook TM, Counsell D, Wildsmith JA, Royal College of Anaesthetists Third National Audit Project. Major complications of central neuraxial block: report on the Third National Audit Project of the Royal College of Anaesthetists. *Br J Anaesth.* 2009;102:179-90.
2. Rodgers A, Walker N, Schug S, et al. Reduction of postoperative mortality and morbidity with epidural or spinal anaesthesia: results of overview of randomised trials. *BMJ.* 2000;321:1493-7.

3. Ghaleb A (2010) Post-dural puncture headache, Review Article. International Journal of Medicine 45-52.
4. Liu H, Kalarickal PL, Rosinia F (2011) A case of paradoxical presentation of postural post dural puncture headache. J Clin Anesth 24: 255-256.
5. Oleson J, Steiner T (2004) The International Classification of Headache Disorders, 2nd edition. The Lancet Neurology 2:720.
6. U. Chohan, G. A. Hamdani Post Dural Puncture Headache. Journal of Pakistan Medical Association 2003;53: 20-23
7. Turnbull DK, Shepherd DB. Postdural puncture headache: pathogenesis, prevention and treatment. Br J Anaesth. 2003;91:718-29.
8. Amorim JA, Gomes de Barros MV, Valença MM (2012) Post-dural (post-lumbar) puncture headache: risk factors and clinical features. Cephalalgia 32: 916-923.
9. Faramarz Mosaffa, Khodamorad karimi et al. Post-dural puncture headache:A Comparison between median and paramedian approaches in orthopaedic patients. anesth Pain. 2011;1:66-69.
10. Campbell, D.C., M.J. Douglas, T.J. Pavy, P. Merrick, M.L. Flanagan and G.H. McMorland, 1993.
11. Comparison of the 25-gauge Whitacre with the 24-gauge Sprotte spinal needle for elective caesarean section: Cost implications. Can. J. Anaesthesia,40: 1131-1135.
12. Kleinman, W. and M. Mikhail, 2006. Spinal, Epidural and Caudal Blocks. In: Clinical Anesthesiology, Morgan, G.E., M.S. Mikhail and M.J. Murray (Eds.). 4th Edn., Lippincott Williams and Wilkins, Philadelphia, PA. Gertse, M.B. and M.J. Gielen, 1999. Seven months delay for epidural blood patch in PDPH. Eur. J. Anaesthesiol., 16: 650-651.
13. Zeidan, A., O. Farhat, H. Maaliki and A. Baraka, 2006.Does postdural puncture headache left untreated lead to subdural hematoma? Case report and review of the literature. Int. J. Obstetric Anesthesia, 15: 50-58.
14. Grieff, J. and M.J. Cousins, 1994. Sub-Arachnoid and Extradural Anesthesia. In: Anaesthesia, Nimmo, W.S., D.J. Row Botham and G. Smith (Eds.). 2nd Edn., Blackwell Scientific Publication,London, pp: 1411-1454.
15. Turnbull DK, Shepherd DB. Postdural puncture headache: pathogenesis, prevention and treatment. Br J Anaesth. 2003;91:718-29.
16. Siamak Afshin Majd, Siamak Afshin Majd, Shahryar Pourfarzam, Hassan Ghasemi, Mohammad Ebrahim Yarmohammadi, Ali Davati, Moslem Jaberian. Evaluation of pre lumbar puncture position on post lumbar puncture headache. J Res Med Sci. 2011;16:282-286.
17. Adugna Aregawi Kassa, Teresa Kisi Beyen² and Zewditu Abdissa Denu. Post dural puncture headache and associated factors after spinal anesthesia among patients in university of gondar referral and teaching hospital, gondar, north west Ethiopia. Anesth Clin Res 2015, 6:6
18. M Kuczkowski (2006) Post-dural puncture headache in pregnant women: What have we learned? Revista Colombiana de Anestesiología 34: 267-72.
19. Bezov D, Lipton RB, Ashina S. Post-Dural Puncture Headache: Part I Diagnosis, Epidemiology, Etiology, and Pathophysiology. Headache 2010; 50: 1144-52.