Original Research Article

A Study Of Post Spinal Headache: The Effect Of Age And Gender On Its Incidence

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Abstract

Background: Post spinal headache is a common complication after spinal anaesthesia, lumbar puncture and myelography. **Aim:** The aim of study is to calculate the incidence of post dural puncture headache in non-obstetric patients**Subjects and Methods:** A prospective observational study was conducted on 150 patients of ASA grade I and II admitted in the department of general surgery, orthopedic and gynecology under spinal anaesthesia. All patients were interviewed after 12 hours, 24 hours, 36 hour, 48 hours, 60 hours and 72 hours as regard to headache, its severity, location character, duration, associated symptoms like nausea, vomiting, auditory and ocular symptoms. PDPH was treated initially conservatively with bed rest, hydration, caffine intake, and analgesic (injection diclofenac 75 mg). If the PDPH persisted longer than 24 hour with same severity, epidural blood patch was considered before discharged from hospital. **Results:** The incidence of PDPH in young patients was 12.12% and in old patients were 3.44%. The incidence of PDPH in female was 12.5% and in male was 4.08%. The onset of PDPH after dural puncture among the patients who develop PDPH occurred within 24 hours in 33.3%, within 30 hours in 40% and within 36 hours in 26.6% of patients. PDPH was most commonly located in occipital region in 60% of patients. In 73.3% of patients the maximum severity was grade II. Nausea and vomiting was associated with severe PDPH. **Conclusion** : Severity of PDPH was mild to moderate. Female significantly have more risk of developing PDPH.

Keywords: Post spinal headache, CSF, spinal needle, diclofenac.

Introduction

Post spinal headache is a common complication after spinal anaesthesia, lumbar puncture and myelography. It is debilitating to the patients and can significantly interfere with the functional capacity and post-operative well-being. The actual mechanism producing the headache is unclear. There are two possible explanations. First, decrease in CSF pressure may cause traction on pain sensitive intracranial structure in the upright position, leading to the characteristic headache. Secondly, the loss of CSF may cause a compensatory vasodilatation. The cushioning effect of the fluid disappears and tension is applied directly to the cranial structure sensitive to pain.[1,2]Headache following spinal anaesthesia i.e. PDPH, which may be incapacitating is bifrontal and occipital and may involve the neck and upper shoulders. It is aggravated by sitting, standing, coughing and straining but subsides completely when the patient lies down. It is often accompanied by nausea, anorexia, photophobia, diplopia, vertigo and neck stiffness. And on rare occasion, cranial nerve palsies. Postdural puncture headache (PDPH) usually occur within the three days of dural puncture and may persist for several weeks or even months causing depression in the patients and anxiety in the anaesthetist.[3,4]The most important factors influencing the frequency and severity of PDPH are the patient's age, spinal needle size and bevel design and bevel orientation. Female gender has also been linked to PDPH.Therefore, the aim of study is to evaulate the incidence of post dural puncture headache in non-obstetric patients.

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Materials and Methods

This prospective observational randomized study was conducted at Department of Anesthesia and Critical Care, at Patna Medical College and Hospital, Patna. The study was approved by the institutional research and ethical committee. The study was conducted between February 2020 and March 2021. An informed and written consent was taken from the participating subjects prior to the commencement of the study. The study was conducted on 150 patients of ASA grade I and II admitted in the department of general surgery, orthopedic and gynecology of our institute during the year 2020.Patient with ages 20 to 65 years, both male and female, and physical status ASA I and II were included in study. Patient refusal, chronic illness (i.e. ischemic heart diseases, diabetes mellitus, bronchial asthma, bronchitis, sinusitis), chronic headache like migraine, hyper tension, previously operated under spinal anaesthesia with past history of PDPH, patients with multiple dural puncture during procedure,patient having physical status ASA III and IV, patient having any spinal deformity and patient having

contraindication of spinal anaesthesia were excluded in this study.Patient was visited a day before surgery for Preanesthetic evaluation and thorough clinical history and examination was done. The procedure was explained to all patients during their preoperative visit and an informed written consent was obtained from each patients. All necessary investigation was done as per institutional protocol. Patients were premedicated with tablet alprazolam 0.25 mg a night before surgery unless contraindicated. On the day of surgery injection ondensetron 4 mg intravenously waw given one hour before surgery.On arrival to operative room wide bore IV cannula was secured. Standard monitoring like NIBP, ECG, Sp02 were attached and all baseline parameters were recorded. All patients were co-loaded with 15 to 20 ml/kg of ringer lactate solution with spinal anaesthesia. Under all aseptic precautions by experienced anaesthesiologist lumbar puncture was performed. After locating L2 – L3 or L3 – L4 interspace in the midline local anaesthetic solution was infiltrated. Lumbar puncture was performed with 25 gauze quinckie needle in lateral decubitus position with bevel facing parallel to the direction of dural fibers in all patients. Those patients were excluded from the study that underwent second dural puncture. After demonstration of free flow of clear cerebrospinal fluid, hyperbaric bupivacaine 0.5% 3 to 3.5 ml was injected slowly with needle's bevel facing cephalad. After withdrawal of the needle, all the patients turned in supine position for 30 minutes, after which they were placed in required surgical position. Level of sensory blockade and changes in parameters like heart rate, BP were recorded. Solution of ringer lactate, normal saline, colloid and blood were transfused as maintenance fluid and also according to the blood loss. Hypotension (defined as fall in blood pressure below 20% of baseline) was treated with bolus IV fluids and 6 mg injection ephedrine intravenously intermittently. Complications like nausea, vomiting, bradycardia, respiratory depression, skin reaction was manages symptomatically. After surgery all patients were shifted to the post anaesthesia care unit with all necessary monitoring. Patients were mobilized after hemodynamic stability, return of sensation and all signs of motor blockade were disappeared. Adequate hydration and bed rest were taken care off. All patients were given slight head low position.

All patients were interviewed after 12 hours, 24 hours, 36 hour, 48 hours, 60 hours and 72 hours as regard to headache, its severity, location character, duration, associated symptoms like nausea, vomiting, auditory and ocular symptoms. PDPH was defined as the occipital, frontal or generalized headache brought on by erect posture and relieved when supine position was resumed.

Patients with a headache were evaluated for the severity and duration of the headache and there response to treatment. PDPH was treated initially conservatively with bed rest, hydration and analgesic (injection diclofenac 75 mg). If the PDPH persisted longer than 24 hour with same severity, an epidural blood patch was considered before discharged from hospital.

Results

A total 186 patients were recruited in the study. All patients were as grade I and II posted for lower abdominal, gynecological and lower limb orthopedic surgeries under spinal anaesthesia. All patients were given spinal anaesthesia with 25 G Quincke needle. No obstetrical patients were included in our study. Demographic data of patients are shown in [Tables 1 and 2].

Table 1: Demographic data for both age groups.

	Young Age (n=99)	Old Age (n=87)
Sex (M/F)	56/43	42/45
Height(cm)	159± 8.11	158±9.4
Weight (kg)	59.1 ± 7.77	62±10.39
BMI(kg/m2)	23.4± 1.62	24.6±2.28

Table 2: Demographic data for both gender groups

	Male (n =99)	Female (n=88)
Age (yr)	35.1±13.8	34.9±10.5
Height(cm)	165±5.25	151± 5.08
Weight (kg)	66.4± 7.78	53.9± 5.36
BMI(kg/m2)	24.43± 2.02	23.46± 1.94

Demographically both age groups were comparable with respect to sex, height, weight and BMI. Both gender groups age is comparable were as there is some difference in height, weight and BMI. This difference can be expected due to normal anatomical and physiological difference in both genders.

PDPH cases were initially treated with bed rest and oral or intravenous hydration. Patients were treated with intravenous injection diclofenac 75 mg when headache was moderate to severe. Total dose of diclofenac required for each patient was noted. All the patients who develop PDPH responded well to the treatment.The maximum severity of headache in all patients varies between grade II to grade III. None of patient in the both the age group have very severe headache of grade IV. The time of onset of development of PDPH was between 24 to 48 hours after dural puncture. None of patients develop PDPH after 24 hours.

Table 3: Showing the incidence of PDPH in the two age groups

Age distribution	With PDPH	Without PDPH	Total
Young age (20- 35year)	12 (12.1%)	87 (87.8%)	99
Old age (35-65 year)	3 (3.4%)	84 (96.5%)	87
Total	15 (8.06%)	171 (91.9%)	186

The difference in the incidence of PDPH was statistically significant in two age groups.

Table 4: showing the incidence of PDPH in the two gender groups

	With PDPH	Without PDPH	Total
Male	4 (4.08)	94 (95.9)	98
Female	11 (12.5)	77 (87.5)	88
Total	15 (8.06)	171 (91.9)	186

In our study female has 3 times more incidence of PDPH than male was statistically significant in two gender groups.

Table 5: showing maximum severity of PDPH

Grade of headache	No. of patients
Mild (grade I)	0
Moderate (grade II)	11(73.3%)
Severe (grade III)	4(26.6%)
Very severe (grade IV)	0

Table 6: showing the time of onset of PDPH in 186 patients

Time	No of patients
24 hours	5(33.3%)
30 hours	6(40%)
36 hours	4(26.6%)
48 hours	0
60 hours	0
72 hours	0

Table 7: Location of PDPH in 186 patients

Location	No of patients
Generalized	3(20%)
Fronto-occipital	3(20%)
Occipital	9(60%)

Table 8: Total dose of diclofenac required during 72 hours following lumbar puncture

Injection diclofenac	No of patients
75 mg	5 (33.3%)
150 mg	7 (46.6%)
225 mg	3 (20%)

Spinal anaesthesia is a popular anaesthetic technique with a low complication rate but it carries the special risk of post dural puncture headache (PDPH). The incidence of PDPH has been reported from 1.2% to 46% with intentional dural puncture and may be as high as 78% with unintentional puncture with large bore needle. Whereas the reported 7.8% to37.2%.The most widely accepted theory concerning the cause of PDPH is based on concept of loss of CSF through a dural tear. When the patient assumes an upright posture lumbar CSF fluid pressure normally increases from 5 to 15 cm of H2O in the horizontal position to about 40 cm of H2O in the sitting position. Owing to the pressure gradient between the intradural and extradural space, spinal fluid is loss into epidural space as long as hole in the dura matter exist. The amount of CSF lost and therefore the incidence of PDPH depends on many factors which include needle dependent factors such as its size, type and bevel direction to the dural fibers and patients related factors such as patient's age, sex and BMI. In our study we evaluated influence of age and gender on the incidence of PDPH.[5,6]

In our study we included 186 patients of ASA grade I and II out of which total 15 patients had PDPH according to defined criteria. The overall incidence of PDPH in present study with 25 gauze needle is 8.06%. our findings were similar to the many studies done previously like Lybecker et al.[1] (7.3%); O Despond (9.3%);[2] Vallego et al (8.7%);[3] Tariq Malik et al (5%);[4] Rasmussen et al (12.6%);[5] shah VR8 (14%) and Vandaum Drippers et al,[6] (11%) In some studies there is higher incidence of PDPH than our study like Kortum et al,[12] (30.96%); J Singh et al.[11] (25%). Few studies like M Seeberger et al. (1.5%); Tariq Malik et al,[4] (5%) show the overall incident of PDPH less than that seen in our study. This difference in incidence of PDPH may be due to difference in the population characteristic, expertise of person performing the spinal anaesthesia, intraoperative variables, low sample size and difference in the methodology in study and may be the psychosomatic component of PDPH.

In our study the incidence of PDPH in young age was 12.12% and in old age group it was 3.44%. This difference was clinically as well as statistically significant with $p<0.05$.In the study done by Vandam and Drippes et al,[6] in 8460 patients in whom total 10,098 spinal anaesthetic was given shown overall incidence of PDPH was 11%. They concluded that old age person and males were least susceptible to develop PDPH than younger patient and females. This observation was statistically significant with our study.

John Lynch et al,[10] in 1991 studied 200 orthopedic patients aged between 15 to 84 years of age and evaluated that incidence of PDPH was 2% and 4% with 22 gauze and 25 gauze whitacare spinal needle respectively. The results shows that incidence of PDPH was 5.6% in female and 0.9% in male and 4 out of 5 patients develop PDPH were younger than 45 years. So they concluded that PDPH is more common in young group. Our results are similar to this study.

Kang et al,[9] studied 730 patients of age group 18 to 86 years who underwent spinal anaesthesia with 26 and 27 gauze quincke needle and observe that overall incidence of PDPH was 9.6% with 26 gauze needle. They also observe that incidence of PDPH in young age group of <40 years of age was 11.9% and in old age group >40 years was 4.8%. so this study is statistically significant with our study.

The extent of gender as an independent risk factor for development of PDPH is not clear. Although it is not apparent why non pregnant female would have higher incidence of PDPH, there may be several physiology, anatomical, or psychological possibility to explain the higher incidence of PDPH in non pregnant female. 1) Female subjects seem to process nociceptive information differently than male subject. 2) It seems that female subject generally exhibit greater sensitivity to experimental noxious stimuli than male. 3) Females also have higher temporal summation of mechanically evoked pain, indicating that female may demonstrate greater degree of central sensitization compare with male. 4) In addition to gender differences in nociceptive threshold and processing, there may be psychological factor that may contribute to some of the difference seen in experimentally induced pain. 5) Socially learned, gender role

expectation of pain may induce the incidence of retrograde pain because male subjects are less likely to disclose the presence of pain than female. 6) Post operatively females report a higher incidence of headache and pain despite possibly having a greater analgesic response to opioids than male. Therefore, both biological and psychological factors may contribute to the difference in perception of pain. 7) Vasodilatation of cerebral vessels normally occurs with patients with PDPH as a homeostatic mechanism to compensate for CSF loss. 7) Finally, younger (30-40yr), presumably premenopausal women have a significantly higher cerebrovascular reactivity compared with older women (50-60yr) and men.[7]

In our study the maximum severity of PDPH in all patients varies between grade II to grade III according to the grading given by Crocker et. al. out of 15 patients 11 (73.3%) patients had moderate and 4 (26.6%) patients had severe PDPH. Severe headache was usually accompanied by nausea and vomiting. Severity of PDPH was usually varies between mild to moderate between many studies. None of the patients in the both group had very severe headache of grade IV. Severity is more in young age group and more in females.

In present study time of onset of development of PDPH was between 24 to 48 hours after dural puncture. Out of 15 patients 5 (33.3%) had PDPH in 24 hours, 6 (40%) had PDPH in 30 hours and 4 (26.6%) had PDPH in 36 hours. None of the patients develops PDPH before 24 hours or after 48 hours. The location of PDPH was occipital in 9 (60%) patients, fronto-occipital in 3 (20%) and generalized in 3 (20%) patients.PDPH cases were initially treated with bed rest, oral and intravenous hydration. Patients were treated with intravenous injection Diclofenac 75 mg when headache was moderate to severe. Out of 15 patients, 7 (46.6%) patients needed 150 mg, 5 (33.3%) patients needed 75 mg and 3 (20%) patients needed 225 mg of total diclofenac. All the patients who develop PDPH responded well with PDPH. None of the patients in our study required epidural blood patch. None of the 15 patients who develop PDPH had other symptoms associated with it like cranial nerve palsy, neck stiffness, vertigo, tinnitus, diplopia or cortical blindness[10-12]

Conclusion

The incidence of PDPH in female was 12.5% and in male was 4.08%. Thus female significantly have more risk of developing PDPH. The onset of PDPH after dural puncture among the patients who develop PDPH occurred within 24 hours in 33.3%, within 30 hours in 40% and within 36 hours in 26.6% of patients. PDPH was most commonly located in occipital region in 60% of patients. Severity of PDPH was mild to moderate. In 73.3% of patients the maximum severity was grade II. Nausea and vomiting was associated with severe PDPH.

Conflict of Interest: Nil Source of support:Nil

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