Effect of Posture on Post Lumbar Puncture Headache after Spinal Anesthesia: A Prospective Randomized Study

KC HB,[1] Pahari T[2]

[1]Department of Surgery

[2]Department of Anesthesia

Gandaki Medical College Teaching Hospital,

Pokhara, Nepal.

Corresponding Author

Hari Bahadur KC

Department of Surgery

Gandaki Medical College Teaching Hospital,

Pokhara, Nepal.

E-mail: hari_kc7@yahoo.com

Citation

KC HB, Pahari T. Effect of Posture on Post Lumbar Puncture Headache after Spinal Anesthesia: A Prospective Randomized Study. *Kathmandu Univ Med J.* 2017;60(4):324-8.

ABSTRACT

Background

Headache after lumbar puncture has long been attributed to early mobilization, and hence prophylactic bed rest had been standard protocol to prevent spinal headache after lumbar puncture. However, trend has been changing towards early mobilization to no need of bed rest at all after lumbar puncture.

Objective

To study the influence of posture in the incidence of post lumbar puncture headache in patients undergoing spinal anesthesia.

Method

In a prospective randomized study, patients undergoing various surgical procedures under spinal anesthesia from February 2013 to January 2014 were included. They were randomly allocated into two groups; group A, no restriction of position and group B, 24 hours bed rest after spinal anesthesia. Two groups were compared with regards to spinal anesthesia complications such as headache, backache, urinary retention, nausea and vomiting.

Result

Total of 112 patients, 58 in group A and 54 in group B, were enrolled in the study. The mean age was 40.13±17.4 years and male: female ratio was 2.5:1. Post spinal headache was observed in 13(22.4%) patients in group A and 13 (24.0%) patients in group B which was statistically not significant (p=0.755). Similarly, there was no significant difference of headache score, and the incidence of other complications like backache, nausea, vomiting and urinary retention between two groups.

Conclusion

There is no significant influence in the incidence of post lumbar puncture headache by early mobilization after spinal anesthesia. Hence, prophylactic bed rest following spinal anesthesia is of no benefit.

KEY WORDS

Post lumbar puncture headache, Posture, Spinal anesthesia.

INTRODUCTION

Spinal anesthesia is one of the most commonly used techniques in anaesthesia. It is safe, easy, economical and preferred over general anesthesia because of its profound analgesia and muscle relaxation. Headache after lumbar puncture is due to the cerebrospinal fluid (CSF) loss through puncture site resulting in decreased CSF pressure and volume which leads to gravity dependent downward sagging of the brain and traction on the pain sensitive structures around the brain. Post dural puncture headache (PDPH) is usually mild to moderate but can be severe enough to necessitate prolonged hospital stay or readmission.[1]

Overall incidence of PDPH varies from 0.1 to 36%, the highest (36%) was reported after ambulatory diagnostic lumbar puncture using a 20 or 22G Quincke needle.[2] More than a century ago, August Bier recommended prophylactic bed rest for 24 hours to prevent post puncture headache and this practice has remained standard till date.[3] In 1998, 83% of the neurology departments in the United Kingdom ordered bed rest after lumbar puncture.[4] Treatment of spinal headache includes bed rest in supine position, adequate hydration and medications (paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs), codeine, caffeine etc).

Although bed rest after spinal anesthesia is still a standard protocol, there is little evidence to support it and trend is changing toward early mobilization. In our hospital, and most of the hospitals in Nepal, 24 hour bed rest is widely practiced following spinal anesthesia. This study is performed to evaluate the influence of posture in the incidence of PDPH in patients operated under spinal anesthesia.

METHODS

This prospective randomized study was performed in Gandaki Medical College Teaching Hospital, Pokhara, Nepal from February 2013 to January 2014. Approval for the study was obtained from the Institutional Review Board of the hospital. Patients undergoing various surgical procedures under spinal anesthesia were included.

After obtaining written informed consent, the patients were randomly divided into two groups by the use of a computer-generated random number table. No restriction of position was allowed for patients in group A, whereas bed rest in supine position for 24 hours was ordered for patients in group B. Patients who had preoperative headache, who required some kind of general anesthesia during operation, patients requiring absolute bed rest after operation or who refused to consent were excluded. Spinal anesthesia was performed according to standard method, all patients in sitting position. Whitaker pencil point 25G spinal needle was used. Bupivacaine 0.5% (heavy) was the drug used for spinal anesthesia. Patients in group A were allowed to sit up and mobilize once the effect of spinal anesthesia is gone. Data were collected in preformed proforma regarding patient demographics, diagnosis, surgical procedure, spinal anesthesia level, number of puncture and amount of CSF leak.

Post-operatively, patients were evaluated for headache and other complications of spinal anesthesia (like nausea or vomiting, urinary retention, backache etc), and if present were recorded on day of surgery and daily for three days. Headache and backache were assessed according to the numeric analogue scale0 to 10: mild, 1 to 3; moderate, 4 to 6 and, severe, 7 to 10 (where 0 refers to no headache or pain and 10 denote the maximum headache or pain patient has ever experienced). The criteria for PDPH was onset of headache after spinal anesthesia within 48 to 72 hours, mostly located to occipital or frontal region, aggravated by erect or sitting position, coughing and straining, and relieved by lying flat. Those who developed headache and other complications were kept in supine position and treated with drugs like caffeine, codeine or NSAIDs. Adequate hydration was maintained with oral fluids or intravenous fluids whenever required. Patients discharged early were contacted by telephone regarding headache or any other complications at one week after spinal anesthesia.

Data were analyzed by using the SPSS, version 17.0 (SPSS Inc., Chicago, IL, USA). Discrete variables were evaluated by chi-square test and continuous variables by unpaired student t-test. All statistical tests were based on two-tailed probability and a p-value <0.05 was considered statistically significant.

RESULTS

Total of 120 patients undergoing various surgical procedure under spinal anesthesia were included in the study. Eight patients were excluded because they required some kind of additional general anesthesia during operation. Thus finally 112 patients, 58 in group A and 54 in group B, were analyzed. The mean age of the patients was 40.13±17.43 (14-78) years. There was male preponderance with male: female ratio of 2.5:1 (Table 1). Most patients were of younger age group with 40.2% being between 15 to 30 years (figure 1).

Of the total patients, 61(54.46%) had general surgical and 51 (45.53%) had urological problems. Diagnosis wise, patients having ureteric calculus were most common followed by hydrocele, hernia and testicular pathologies, and anorectal disorders respectively (figure 2).

The mean number of puncture during spinal anesthesia was 1.21±0.53 times; single puncture was successful in 84% cases and 16% required multiple attempts. Average amount of 0.5% Bupivacaine used was 2.92±0.58 ml. L2-L3 and L3-L4 space was the level of lumbar puncture in 55 patients each, while L4-L5 space was utilized in two

Table 1. Demographics and descriptive analysis.

Variables	Total (n=112)	Group A (n=58)	Group B (n=54)	p value
Age	40.13±17.43	42.98±16.96	36.94±17.56	0.067
Sex ratio (M/F)	80/32	41/18	39/14	0.632
No. of punctures	1.21±0.53	1.20±0.51	1.21±0.56	0.968
CSF leak (drops)	1.64±0.95	1.80±1.11	1.47±0.72	0.073
Amount of drug used in ml (Bupivacaine 0.5%)	2.92±0.58	2.92±0.57	2.92±0.59	0.996
Spinal level				
L2-L3	55	33	22	
L3-L4	55	26	29	0.132
L4-L5	2	0	2	

CSF, Cerebrospinal fluid.

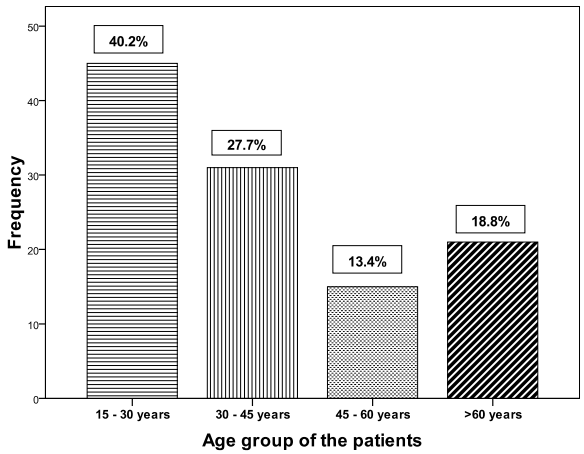

Figure 1. Age distribution of the patients.

patients. On average, 1.64±0.95 drops of CSF leaked during the procedure (Table 1).

Post spinal headache was observed in 26 (23.2%) patients (figure 3) and the average headache score was 3.96±1.42. The incidence of headache was not statistically significant between group A and group B (22.4% vs 24.0%; p=0.775). Sixteen patients had mild headache, nine had moderate and only one had severe degree of headache (figure 4). The total duration of headache on average was 2.81±0.84 (2-5) days and backache lasted for 2.52±0.58 (2-4) days. The complications are listed in table 2. There was no significant difference in the incidence of post spinal anesthesia complications between two groups (Table 2).

Patients with headache were treated with bed rest, oral fluids and medication like codeine, paracetamol, NSAIDs, caffeine etc. Intravenous fluid was required in 31.74% patients. Blood patch injection was not performed in any cases. Mean hospital stay of the patients was 3.60±0.87 (2-6) days.

In present study, two groups were comparable with regards to demographic parameters, surgical procedures and complications of spinal anesthesia including post spinal headache and its severity.

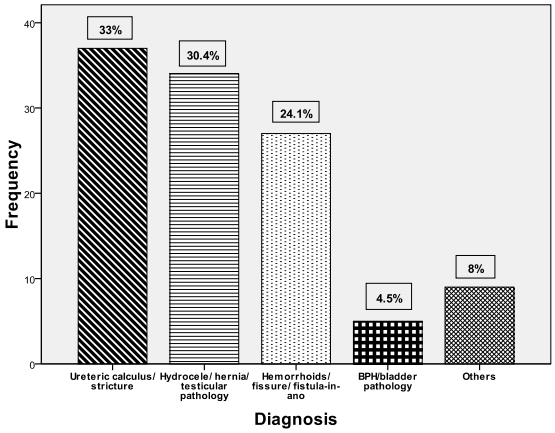

Figure 2. Diseases for which patients underwent spinal anesthesia.

Table 2. Incidence of complications after spinal anesthesia.

Symptoms	Total (n=112)	Group A (n=58)	Group B (n=54)	p value
Headache	26(23.2%)	13(22.4%)	13(24.0%)	0.755
Headache score	3.96±1.42	4.23±1.48	3.69±1.37	0.347
Duration of headache (days)	2.81±0.84	2.77±0.72	2.85±0.98	0.823
Backache	28(25.0%)	13(22.4%)	15(27.7%)	0.444
Backache score	3.18±0.94	3.23±1.01	3.13±0.91	0.791
Duration of backache (days)	2.52±0.58	2.58±0.66	2.47±0.51	0.613
Nausea/vomiting	4	4	0	0.120
Urinary retention (among 76 patients who were not catheterized preoperatively)	19/76	10/40	9/36	1.000

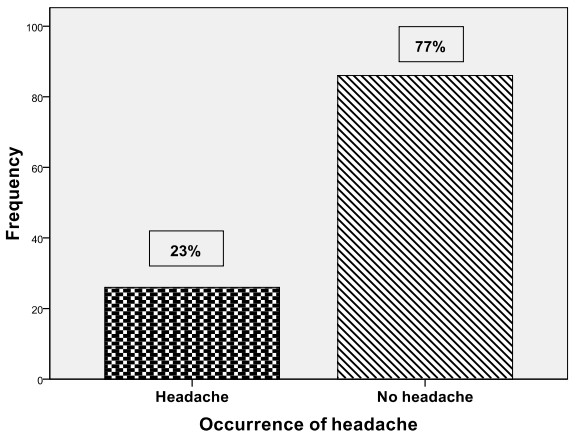

Figure 1. Diseases for which patients underwent spinal anesthesia.

DISCUSSION

Headache following lumbar puncture is a well-known and well described complication. In 1898, Karl August Bier, a German surgeon, was administered spinal anaesthesia, on his own request, by his assistant. During the attempt, a lot of CSF was lost and Bier developed headache, and this was the first documented case of PDPH.[3]

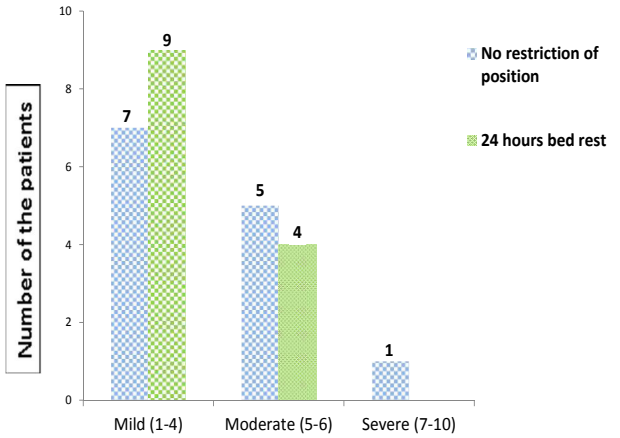

Figure 4. Severity of headache using headache score in both groups.

The spinal headache is usually described as a severe, dull, non-throbbing pain, usually fronto-occipital, which is aggravated in the upright position and diminished in the supine position. It may be accompanied by nausea, vomiting, visual disturbances or auditory disturbances and is exacerbated by head movement. The postural headache is so characteristic that in its absence the diagnosis of PDPH should be questioned and other serious intracranial causes for headache must be excluded. Ninety percent of PDPH occurs within three days of the procedure and 66% starts within 48 hours.[5] It usually resolves spontaneously within a few days, but it can last for a week or more.

Larger the hole in dura mater, greater will be the leakage of CSF and longer the time required for repair. Thus the headache, which is due to CSF leak, mostly depends on size of needle used, technique of needle insertion, number of punctures etc.

Various maneuvers to prevent PDPH were tried in the past. Bed rest, ranging from a few hours up to 24 hours, is frequently used in several countries. In United Kingdom, bed rest between six to 24 hours were practiced in 10% of the centers whereas, between one to six hours in 70% centers.[4] In an Austrian survey, 24 hours of bed rest after lumbar puncture was practiced in 48% of neurological departments.6 The rationale for this practice was to allow the dural hole to repair itself, at least to some extent, before ambulation. Thus prophylactic bed rest has established itself in routine clinical practice, though its value is questionable and trend of early mobilization is being established.[4]

In present study, the two groups were comparable in respect to age of the patients, sex ratio, numbers of puncture during spinal anesthesia, CSF leak, spinal level and amount of drug used without any significant differences (Table 1). Headache and backache was observed in 26 patients (23.2%) and 28 patients (25.0%) respectively, which is in accordance with the study done by Friedrich et al. where the headache and backache occurred in 31% and 33% patients.[7] The occurrence of PDPH in group A and B is 22.4% and 24.0% respectively, which is statistically not significant (p=0.755). Similarly, severity of headache and incidence of other complications were comparable between two groups (Table 2). The incidence of headache was more among females than males (34.4% vs 20%), which was statistically not significant. This finding is in accordance with study by Singh et al. from Nepal (70% VS 30%) and Evans et al. from USA (twice common among female).[8,9]

The practice of post spinal anesthesia prophylactic bed rest is gradually declining. As early as 1964, an extensive review had shown that prophylactic bed rest was of no advantages.[10] In a systemic review and meta-analysis study by Thoennissen et al, randomized controlled trials involving 1083 patients assigned to immediate mobilization or a short period of bed rest (up to 8 hours) and 1128 patients assigned to a longer period of bed rest (upto 24 hours) were evaluated.[11,16] None of the trials showed that longer bed rest was superior to immediate mobilization or short bed rest for preventing headache after lumbar puncture. In another study, Cook and colleagues randomized 102 patients undergoing operation under spinal anesthesia into four hours and 24 hours recumbency groups.[12] The development of PDPH, when recumbency was four hours or 24 hours was not statistically different (11.6% and 11.9% of patients).

Instead, the recent studies have shown that the patients maintaining longer bed rest reported more headaches as compared to early mobilization groups. Vimala et al. divided 208 patients into 24 hours bed rest and immediate ambulant group.[13] The incidence of headache (18% vs 15%) as well as its severity was more in bed rest group.[13] In a similar study by Andersen et al. with 112 patients undergoing transurethral surgery, the spinal headache was observed in 14% and 11% of patients in 24 hours recumbency and immediate mobilization group respectively.[14] A study by Fassoulaki, a randomized comparison of 24 hour bed rest and immediate mobilization following spinal anesthesia in 69 patients undergoing TURP, demonstrated significantly more headaches with bed rest group (p value < 0.01).[15]

Diagnostic lumbar puncture have also shown favorable outcome with early mobility. Ebinger et al. studied the effect of 24-hour bed rest or free mobility on the frequency of complaints following diagnostic lumbar puncture in a randomized trial of 111 children and adolescent.[7] They found that the bed rest group developed more headache and backache (39% vs 21%; and 42% vs 23% respectively), and thus concluded that prophylactic bed rest following lumbar puncture in children and adolescents is of no benefit and may actually be disadvantageous.[7] Similar results are reported in a statement of the American Academy of Neurology and two other studies which compared 24-hour bed rest and immediate free mobility following diagnostic lumbar puncture.[9,16,17]

Our study did have few limitations. The sample size is small and the study is from single institute. Though this study has

involved various operations from surgical department, it lacked gynecological and orthopedics patients. However, this study has addressed the common practice of post spinal bed rest, which has been challenged by recent studies. We believe that our study is still valuable as pilot study, which will stimulate further larger and multi-institutional prospective studies to provide more insight knowledge on the subject.

CONCLUSION

There is no significant influence in the incidence of post lumbar puncture headache and other complications by early mobilization after spinal anesthesia when compared with 24 hours bed rest. Hence, prophylactic bed rest following spinal anesthesia is of no benefit.

REFERENCES

1. Tohmo H, Vuorinen E, Muuronen A. Prolonged impairment in activities of daily living due to post dural puncture headache after diagnostic lumbar puncture. *Anaesthesia.* 1998;53:296–307.
2. Kuntz KM, Kohmen E, Steven JC, Miller P, Offord KP, Ho MM. Post lumbar puncture headache: experience in 501 consecutive procedure. *Neurology.* 1992;42(10):1884-7.
3. Bier A. Versuche über Cocainisirung des Rückenmarkes. (Experiments on the cocainization of the spinal cord). *Deutsche Zeitschrift fur Chirurgie.* 1899;51:361–9.
4. Serpell MG, Haldane GJ, Jamieson DRS, Carson D. Prevention of headache after lumbar puncture: questionnaire survey of neurologists and neurosurgeons in United Kingdom. *Br Med J.* 1998;316:1709–10.
5. Turnbull DK, Shepherd DB. Post-dural puncture headache: pathogenesis, prevention and treatment. *British Journal of Anesthesia.* 2003;91(5):718-29.
6. Thoennissen J, Lang W, Laggner AN, Müllner M. Bettruhe nach lumbalpunktion: eine österreichweite umfrage. *Wien Klin Wochenschr.* 2000;112:1040-3.
7. Ebinger F, Kosel C, Pietz J, Rating D. Strict bed rest following lumbar puncture in children and adolescents is of no benefit. *Neurology.* 2004;62:1003–5.
8. Singh J, Ranjit S, Shrestha S, Limbu T, Marahatta SB. Post dural puncture headache. *Journal of Institute of Medicine.* 2010;32(2):30-2.
9. Evans RW, Armon C, Frohman EM, Goodin DS. Prevention of post-lumbar puncture headaches: Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. *Neurology.* 2000;55:909–14.
10. Tourtellotte WW, Haerer AF, Heller GL, Somers JE, editors. Post-lumbar puncture headaches. Springfield, Illinois: Thomas;1964. p. 87–95.
11. Thoennissen J, Herkner H, Lang W, Domanovits H, Laggner AN, Müllner M. Does bed rest after cervical or lumbar puncture prevent headache? A systematic review and meta-analysis. *CMAJ.* 2001;165(10):1311-6.
12. Cook PT, Davies MJ, Beavis RE. Bed rest and post lumbar puncture headache: The effectiveness of 24 hours' recumbency in reducing the incidence of post lumbar puncture headache. *Anaesthesia.* 1989;44:389-91.
13. Vimala J, Peter JV, Jeyaseelan L, Prabhakar S, Cherian AM. Post lumbar puncture headache: is bed rest essential? *J Assoc Physicians India.* 1998;46(11):930-2.
14. Andersen APD, Wanscher MCJ, Hüttel MS. Postspinaler Kopfschmerz. Ist die 24stündige Bettruhe eine Prophylaxe? *Reg Anaesth.* 1986;9: 15-7.
15. Fassoulaki A, Sarantopoulos C, Adreopoulou K. Is early mobilization associated with lower incidence of postspinal headache? *Anaesthesiol Reanimat.* 1991;16:375–8.
16. Carbaat PAT, van Crevel H. Lumbar puncture headache: controlled study on the preventive effect of 24 hours' bed rest. *Lancet.* 1981;2:1133-5.
17. Congia S, Tronic S, Ledda M. Lumbar puncture headache and posture: electroencephalographic correlations. *Boll Lega It Epil.* 1985;5:237–8.