Incidence of Postspinal Headache and Low Backache Following the Median and Paramedian Approaches in Spinal Anesthesia

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Abstract

Background and Aims: Postspinal headache and low backache are common complaints following spinal anesthesia which regresses spontaneously but sometimes becomes very troublesome for the patient as well as for the anesthesiologists. The aim of this study was to evaluate the incidence of postspinal headache and low backache after spinal anesthesia in lower abdominal surgery. Materials and Methods: One hundred patients of 18–60 years of age group with patients physical status the American Society of Anesthesiologists Class I or II after due consent divided into equal numbers of two groups: median (M) approach and paramedian (P) approach scheduled for lower abdominal surgery. Group M (50 patients) received spinal by median approach while in Group P (50 patients) received spinal by paramedian approach. The incidence of postspinal headache and low backache was observed in each group. All the patients were observed up to 7 days postoperatively. Data collected was analyzed statistically by SPSS (IBM SPSS Statistics for Windows, Version 22.0, Armonk, NY: IBM Corp) and Chi-square test, and P < 0.05 considered as statistically significant. Results: Postspinal headache was observed to be 4% in paramedian approach and 20% in median approach group. Backache incidence recorded in both the groups was 2% and 10%, respectively. P value calculated statistically was < 0.05 and hence statistically significant in paramedian approach in respect of incidence of both postspinal headache and backache. Conclusion: Incidence of postspinal headache and low backache is less in paramedian approach than in median approach.

Keywords: Cerebrospinal fluid, low backache, postspinal headache, spinal anesthesia

INTRODUCTION

Karl August bier was considered pioneer of spinal anesthesia. He reported postspinal headache in his patients and concluded that headache may be due to cerebrospinal fluid (CSF) leak by the use of large bore needles.1 It begins typically within 2 days but regresses spontaneously in a few days. Sometimes, it becomes very severe causing symptoms such as photophobia, nausea, vomiting, neck stiffness, tinnitus, diplopia, dizziness, and severe headache of throbbing nature in the bifrontal and occipital region exacerbated in sitting or standing posture. This is thought to be caused by excessive loss of CSF through dural hole leading to low intracranial pressure, resulting in traction on the pain-sensitive parietal dura mater and compensatory venodilatation.2,3 Emphasis on using small-gauge spinal needles and needle tip designs to minimize trauma to the dura was advocated. Small-gauge needles (size 25–29) and noncutting bevel needles can reduce the incidence of postspinal headache and low backache to some extent, but there are limitations of their use because of high failure rate, cost factor, availability, and need of introducer.4,5 Another method to decrease incidence of postspinal headache in a study by Behary and Mohammed6 on pregnant patients posted for cesarean section under spinal anesthesia found that postspinal headache is less if subarachnoid block was administered by paramedian approach as compared to median approach. This is based on the fact that, in the paramedian approach, perforation of the dura and arachnoid occurs at different angles which produce a valvular mechanism that prevented a loss of CSF flow to the epidural space. Another common complaint after is low backache following spinal anesthesia in median approach. This pain can be of short duration lasting for 72 h to 1 week or can be persistent lasting beyond 3 months.7 It may be due to trauma to the ligaments resulting from needle puncture ensuing...
inflammation, reflex spasm of the paraspinous muscles, and myalgia or due to transient neurological syndrome.[8]

Based on the above studies, we hypothesized to conduct this study to find out if there can be a difference in the incidence of postspinal headache with paramedian and median approaches of the subarachnoid block. We also observed the incidence of low backache in this study.

**Materials and Methods**

After due permission of the Institutional Ethics Committee, this study was conducted on 100 patients of 18–60 years of age group with physical status of the American Society of Anesthesiologist Class I or II undergoing lower abdominal surgery under spinal anesthesia.

**Exclusion criteria**

Patients with diabetes mellitus, ischemic heart disease, hypertension, cluster headache like migraine, stress headache, bleeding diatheses, and refusal to spinal were excluded from the study.

Preoperative assessment of patient including routine blood investigations, electrocardiogram (ECG), and X-ray chest was done a day before surgery, and informed consent was taken. Procedure was explained to patients 1 day before operation. On the day of surgery, patient was shifted to operation theater and was attached to multipara monitor to record pulse rate, blood pressure, ECG, and oxygen saturation. Before the start of procedure, 750 ml of ringer lactate infusion was given over 30 min as preloading. Patients were randomly divided in double-blind fashion into two groups (Group M and Group P) of 50 each. In Group M (median approach), subarachnoid block was given with spinal needle no. 25 introduced at intervertebral space between L₁ and L₂ below the spinous process of upper vertebra, whereas in Group P (paramedian approach), the spinal needle was introduced at 1 cm below and lateral to the caudal edge of the spinous process of superior vertebra in the lumbar region with same gauge of spinal needle.

All the patients were observed for 1 week for postspinal headache and low backache by an independent observer. The observer was blinded to the approach used for subarachnoid block. The data collected was analyzed statistically significant. P < 0.05 considered as statistically significant.

Numeric visual analog pain score was used to assess the postspinal headache and low back pain in both the groups. Any case of persistent postspinal backache after discharge was followed up to 7 days through telephonic communication with the patient. Following were the parameters used to assess the pain.

**Results and Analysis**

Demographic data variables (mean age, mean weight, and sex ratio) in both the groups were not statistically significant as shown in Table 1.

In paramedian approach, 48 (96.0%) of the patients complained no headache while one patient complained of mild (2%) and moderate (2%) postspinal headache, respectively. No case was reported with severe postspinal headache.

In median approach, 40 patients complained no spinal headache (80.0%) while 4 patients (8.0%) and 6 patients (12.0%) complained of mild and moderate postspinal headache, respectively, and no case was reported with severe postspinal headache. On intergroup comparison, data were statistically significant (P < 0.05) as shown in Table 2.

In paramedian approach, 49 (98.0%) of the patients complained no back pain while one patient complained of mild back pain (2%) and no case was reported with moderate and severe back pain.

In median approach, 45 (90.0%) patients complained of no back pain, whereas 3 (6%) of the patients complained of mild back pain and 2 (4.0%) complained of moderate back pain. No case was reported with severe back pain. On intergroup comparison, data were statistically significant (P < 0.05) as shown in Table 3.

**Discussion**

A postspinal headache is one of the most common adverse effects occurring in patients undergoing surgery under spinal anesthesia.[11] It may be due to damage to the collagen and elastic fibers distribution in the dura mater. Studies on structure of dura mater led to the fact that thickness in different areas of dura mater is variable. Dural perforation is less likely in thick areas than thin areas of the dura[9] results in more CSF leak leading to traction on pain-sensitive dura and counter venodilation of the brain vessels (low CSF pressure and vasodilation headache) on adopting erect posture and typically relieved on lying down position.[10] We have done randomized control study to compare the incidence of postspinal headache.

**Table 1: Demographic variables**

| Variables     | Group M       | Group P       | P      | Significance |
|---------------|---------------|---------------|--------|--------------|
| Age (years), mean±SD | 39.2400±11.80723 | 40.3000±13.60110 | 0.68   | NS           |
| Weight (kg), mean±SD  | 50±2.0        | 55±2.5        | >0.05  | NS           |
| Sex (%)        |               |               |        |              |
| Male           | 17 (34.0)     | 20 (40.0)     | 1.000  | NS           |
| Female         | 33 (66.0)     | 30 (60.0)     |        |              |

Mean±SD of demographic variables. SD=Standard deviation, NS=Not significant
and low backache with median and paramedian approaches of subarachnoid block.

In our study, the incidence of postspinal headache in paramedian group was 4% and in median group was 20%, and on intergroup comparison, data were statistically significant. Haider et al.\cite{11} done a study on 25 patients posted for elective surgical procedure under spinal anesthesia found that incidence of postspinal headache in paramedian and median approaches was 4% and 28%, respectively.

Sheybani et al.\cite{12} also studied two approaches of subarachnoid block and found that incidence of postspinal headache is less in paramedian approach (12%) as compared to median approach (15%).

Behary and Mohammed\cite{6} had done a study on cesarean patients and made the observations that incidence of postspinal headache was less in paramedian approach (5.2%) as compared to median approach (19.6%).

The incidence of backache in our study in paramedian group and median group was 2% and 10%, respectively. On intergroup comparison, data were statistically significant. Behary and Mohammed\cite{6} also compared the incidence of low backache in cesarean patients and found that results of backache were 7.1% in median group and 1.7% in paramedian group.

Rabinowitz et al.\cite{13} also compared the two approaches of spinal anesthesia on 100 patients undergoing lower abdominal and lower limb surgeries and found that there is decreased incidence of postspinal puncture headache and backache in paramedian as compared to median group.

One of the reasons behind the low incidence of postspinal headache and low backache can be the easiness of the approach and results in decreased number of attempts in paramedian approach thus leads to less trauma to the dura mater and ligaments.

Janik and Dick\cite{14} found that, in paramedian approach, spinal needle enters interlaminar space 1 cm below and 1 cm lateral to the spinous process of upper vertebra of the intervertebral space. It pierces the dura after entering ligamentum flavum sparing supraspinous and interspinous ligaments. The reason for less occurrence of postspinal headache and backache might be due to ease of entrance of spinal needle and larger interlaminar window between the laminar processes of adjoining vertebrae causing minimal trauma to the dura and thus less CSF loss in comparison to median approach. This may be the reason assigned to decreased frequency of postspinal headache and low backache in paramedian approach.

**Conclusion**

We conclude that the incidence of postspinal headache and low backache in paramedian was lesser than median approach. However, it needs further investigation on more randomized control trials to know the effectiveness of paramedian approach of spinal anesthesia in decreasing the incidence of postspinal headache and low backache.

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**Conflicts of interest**

There are no conflicts of interest.

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**Table 2: Incidence of postspinal headache**

| Incidence of postspinal headache | VAS score | Group M (%) | Group P (%) | Total (%) | P | Significance |
|----------------------------------|-----------|-------------|-------------|-----------|---|--------------|
| Nil                              | 0         | 40 (80.0)   | 48 (96.0)   | 88.00     | - | -            |
| Mild                             | 2         | 4 (8.0)     | 1 (2.0)     | 5.00      | 0.005 | Significant  |
| Moderate                         | 5         | 6 (12.0)    | 1 (2.0)     | 7.00      | 0.002 | Significant  |
| Severe                           | 7         | -           | -           | -         | - | -            |

**Table 3: Incidence of postspinal low backache**

| Incidence of postspinal low backache | VAS score | Group M (median) (%) | Group P (paramedian) (%) | Total (%) | P | Significance |
|------------------------------------|-----------|----------------------|--------------------------|-----------|---|--------------|
| Nil                                | 0         | 45 (90.0)            | 49 (98.0)                | 94.00     | - | -            |
| Mild                               | 2         | 3 (6.0)              | 1 (2.0)                  | 4.00      | 0.008 | Significant  |
| Moderate                           | 5         | 2 (4.0)              | 0                        | 2.00      | 0.003 | Significant  |
| Severe                             | 7         | -                    | -                        | -         | - | -            |

**VAS=Visual analog scale**
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