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## **Spinal Anaesthesia with Median and Paramedian Approach in Geriatric Patients Undergoing Lower Limb Surgery**

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### **ABSTRACT:**

**AIM :** To find out the efficacy, success rate, advantages and complication of median and paramedian technique for spinal anesthesia in geriatric patients.

### **MATERIALS AND METHODS:**

After approval of our institutional ethical committee and informed written consent from patients obtained, an observational study was conducted. Over 60 patients scheduled to undergo elective surgery under spinal anesthesia were included in the study. The study included 60 patients of either sex, aged 65 years and above, who received spinal anaesthesia either with the median approach (group M, n=30) or paramedian approach (group P, n=30). Inclusion criteria were patients with age above 65 years undergoing lower limb surgery under spinal anesthesia with ASA grade I & II. Exclusion criteria were patients not willing for spinal anesthesia, pre-existing neurological disorders, coagulopathies and infection at the site of puncture, spinal abnormalities and more than three attempts for spinal.

### **RESULTS:**

The success rate of both the groups was 100%, while the first attempt success rate was 92% in group P and 68% in group M. Paraesthesia was felt in 4 patients (12%) in median group and in 2 (6%) in paramedian group. Hemorrhagic tap was seen in 2 patients in group P as against one in median group. None of the patients had postdural puncture headache (PDPH).

### **CONCLUSION:**

Thus we conclude that paramedian approach is a better approach for spinal anesthesia in geriatric patients and should be routinely used as first choice.

### **INTRODUCTION**

Subarachnoid blockade is widely used due to its procedural simplicity, low cost and better physiological benefits and thus reduced complications than that of general anesthesia. Subarachnoid space can be approached from the posterior aspect of the vertebral body either through the median or paramedian approach (PMA). Accurate identification of the subarachnoid space is paramount as multiple attempts at needle insertion may cause patient

discomfort, higher incidence of spinal hematoma, trauma to the neural structures and PDPH. The most commonly practiced technique is the median approach. This approach is technically difficult in the geriatric patients because of degenerative changes in the spine. Calcification of supra-spinous and inter-spinous ligaments in the geriatric age group makes median approach difficult. Paramedian approach is not routinely practiced and is used only when median approach has failed or is not possible due to anatomical variations like ankylosing spondylitis. PMA is also a very easy and effective technique that can be practiced routinely as well as for some clearly indicated cases. Thus we decided to do an observational study to find out the efficacy of median and paramedian approach of spinal anaesthesia with regards to success rate, difficulties, advantage and complications in geriatric patients.

## METHOD

After ethical approval, an observational study was conducted in Hi-tech Medical college and Hospital at Bhubaneswar. Informed consent was obtained and 60 patients scheduled to undergo elective surgery under spinal anesthesia were included in the study. Inclusion criteria were patients with age above 60 years undergoing surgery under spinal anesthesia. Exclusion criteria were patients not willing for spinal anesthesia, pre-existing neurological disorders, coagulopathies, and infection at the site of puncture, spinal abnormalities and more than three attempts for spinal. Selected patients were allotted to Group M (patients received spinal anesthesia with median approach) or Group P (patients received spinal anesthesia with paramedian approach) by systemic randomization. Each group had 30 patients. Pre-operative evaluation and routine investigations were done. All the patients were pre-loaded with 500 ml Ringer's lactate and monitoring was done with ECG, heart rate, non-invasive blood pressure and arterial oxygen saturation. Under all aseptic conditions, spinal anesthesia was given with 25 gauge spinal needle with either the median or paramedian approach in sitting position at L3-L4 inter space. Around 2.5 to 3.5ml 0.5% heavy bupivacaine was used according to the type of surgery. An attempt was considered unsuccessful if the operator removed the stylet and there was no CSF. In case of failure or insufficient block, general anesthesia was given. The number of attempts, success rate, paraesthesia (sharpshooting pain along the nerve roots), bloody tap, skin to needle distance was observed. The patients were followed for 48 hours for PDPH.

## RESULTS

Age of the patients varied between 60 and 82 years. The mean age in the median group was 69.4 and in the paramedian group 68.1. The mean weight in group M was 62kg and in paramedian group was 63.1 kg. The mean age group and weight were similar in both the groups. There were 22 females and 28 males in median group. The paramedian group had 26 females and 24 males.

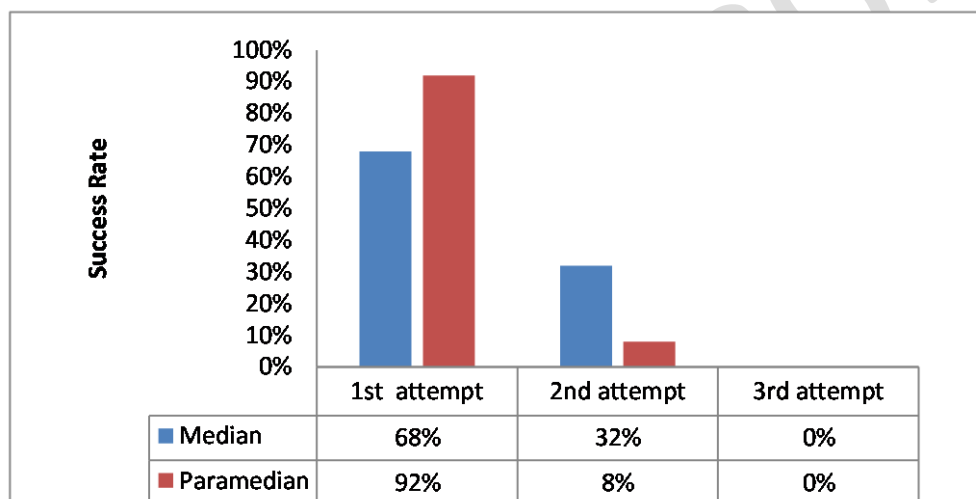
*Table 1. Demographic data*

	Group M	Group P
Mean age (in years)	69.4	71
Mean weight (kg)	62	63.1

More than one attempt was required in 16 patients (32%) in median group and 4 patients (8%) in the paramedian group. First attempt success rate was 68% in median group and 92% in the paramedian group.

Attempts	Median group		paramedian	
	Number of patients	Percentage	Number of patients	Percentage
First	21	68%	27	92%
Second	9	32%	3	8%
More than three	0	0	0	0

*Table 2. Number of attempts*



Paraesthesia was felt by 4 patients (12%) in median group and 2 patients (4%) in paramedian group. Haemorrhagic tap was noticed in 1 patient in median group and in 4 patients in paramedian group which gradually cleared. None of the patient in both the groups had any PDPH or any other complication. There was no failure of spinal anesthesia.

Side effects	Median group		Paramedian group	
	Frequency	Percentage	Frequency	Percentage
Haemorrhagic tap	1	3%	3	9%
Paraesthesia	4	12%	2	6%
PDPH	0	0	0	0

*Table 3. Prevalence of side effects*

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## DISCUSSION

Spinal anaesthesia is performed for lower abdominal and lower limb surgeries as it reduces post operative morbidity and other complications.

Usually spinal anesthesia is performed using the median approach. This can be difficult in elderly patients with calcified ligaments. It can also be difficult in obese patients and in patients for cesarean section where adequate flexion for proper positioning is not possible. Median approach involves passage of needle through supraspinous, interspinous and ligamentum flavum. Calcification of supraspinous and inter spinous ligaments in older patients causes difficulty in passing thin gauge spinal needles. Also using large bore needles can cause patient discomfort, pain and increase incidence of PDPH.

An alternative approach to needle placement is paramedian approach (PMA) and is associated with less technical problems as compared to median approach. The PMA avoids the supra spinous and inter spinous ligaments. PMA hits the ligamentum flavum directly after passing through the para-spinal muscles. In PMA, there is less chance of bending or kinking of needle as bony ligaments are avoided. The paramedian approach does not require flexed position as in median approach.

Podder et-al concluded that with a patient sitting in an unflexed position it is usually possible to insert needle in PMA than in median approach. Patients and compared the two approaches demonstrating success rate of 85% in PMA as compared to 45% in median approach.

Mericq O et al concluded that in patients who are elderly and with spinal deformity, PMA is a safe alternative with success rate of 100%.

Ahsan –ul-haq et al demonstrated that success rate with paramedian approach was 100% with the first attempt success rate of 60%.

Our success rate with paramedian approach was 100%,with the first attempt success rate of 92%.Paraesthesia was noted when the patient complained of a sharp pain in hips or legs while inserting the needle.

Blomberg et al showed a statistically significant difference between the two techniques with regard to repeated number of attempts and paraesthesia.

In our study paraesthesia was felt in 4 patients in the median group and 2 patients in paramedian group. Vascular trauma can be a complication of spinal anesthesia. Epidural vessels are situated laterally. So median approach provides a relatively avascular plane. On the other hand paramedian approach may encounter vessels leading to bloody tap. In our study the incidence of haemorrhagic tap in the paramedian group was 8% which is comparable with other studies.

PDPH is the commonest complication of spinal anesthesia. It results due to excessive loss of cerebrospinal fluid(CSF) through the dural puncture resulting in lowering of CSF pressure and traction on intracranial structures. PDPH depends on patient's age, number of punctures, needle size and bevel. The incidence is reduced when smaller size, Quinke needle is used. With the paramedian approach there is less leakage of CSF and less chances of PDPH. None of our patients in the study had PDPH. This may be due to smaller gauge needle, older age group and single punctures in our study. Other complications like backache was not present in our study as there was no excessive flexion, use of large gauge needles, and multiple punctures. Advantage of the paramedian approach is a large target area. By

placing the needle laterally, the anatomical limitation of the spinous process is avoided. This is of advantage in elderly patients where interspinous spaces may not open up.

In conclusion, paramedian approach is better than median approach especially in the geriatric patients and should be used more often as the first approach and not after median fails.

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