

Patient Acceptance Towards Paramedian Approach of Spinal Anaesthesia Versus Midline Approach in Proctological (Anorectal) Surgeries: A Prospective Comparative Study

Nitin Krushnarao Nachane

¹Consultant Anaesthesiologist, Department of Anaesthesiology, Healing Hands Clinic, Pune, Maharashtra, India.

Abstract

Background: The method of spinal anaesthesia is selected when dealing with most proctological operations. The midline mode is conventionally a good choice, whereas the paramedian mode is often used in patients whose anatomy is difficult to locate. The objectives are to compare patient acceptance, comfort, proximal characteristics, and postoperative outcomes between the paramedian and midline techniques of spinal anaesthesia in patients undergoing elective anorectal surgery. **Material and Methods:** Within an anorectal surgery case study, 80 patients were asked to receive spinal anaesthesia between January and December 2025, which compared the patient acceptance, comfort, characteristics of the procedure, and postoperative outcomes between paramedian and midline methods. Two groups of patients were used (Group M, n=40) (midline approach) and (Group P, n=40). Patient acceptance was measured using a structured questionnaire and a visual analogue scale (VAS) for pain during needle insertion. Secondary outcome measures included the number of attempts, ease of landmark identification, time to a successful block, complications, and general patient satisfaction with the treatment, which showed significant differences between the paramedian and midline groups ($p<0.05$). The paramedian method required fewer attempts and had lower VAS pain scores. Response to study questions: Group P had a lower incidence of post-dural puncture headache and backache, although the difference was statistically insignificant. **Results:** Patient acceptance and satisfaction scores were significantly higher in the paramedian group compared to the midline group ($p<0.05$). The paramedian approach required fewer attempts and was associated with lower VAS pain scores. Incidence of post-dural puncture headache and backache was lower in Group P, though not statistically significant. **Conclusion:** Group P had a lower incidence of post-dural puncture headache and backache, but the difference was not significant compared with the midline approach in proctology surgeries, making it a worthy alternative, particularly in patients with problematic spinal anatomy.

Keywords: Spinal anaesthesia, Paramedian approach, Midline approach, Patient acceptance, Anorectal surgery.

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INTRODUCTION

One of the most widely used forms of regional anaesthesia in infra-umbilical surgeries, especially those involving the anorectum (e.g., haemorrhoidectomy, fistulectomy, fissurectomy, and abscess drainage), is spinal anaesthesia. They are often done as elective surgeries, which need a thick, trustworthy perineural block with few systemic consequences, quick onset, and excellent postoperative analgesia. Spinal anaesthesia meets these needs, hence it is much more preferable to general anaesthesia in most centres, particularly in resource-deprived settings.^[1,2]

The most common technique, traditionally taught and practiced in the administration of spinal anaesthesia, is the midline technique. Under this method, the spinal needle passes through the supraspinous ligament, interspinous ligament, ligamentum flavum, dura mater, and arachnoid mater and finally into the subarachnoid space. Despite being effective, the midline technique might not only be linked with technical challenge, more attempts, but also higher chances of complications like post-dural puncture headache, backache, and the occurrence of traumatic needle positioning, especially in old age, obese patients, and those

having degenerative changes of the spine or restricted span of the spinal flexion.^[3-4]

The paramedian method of spinal anaesthesia was devised as an alternative to the midline method to overcome some of its shortcomings. The paramedian technique involves the needle passing under the supraspinous and interspinous ligaments and directly into the ligamentum flavum, which may increase resistance to pushing the needle through. The method is especially helpful in patients whose interspinous ligaments are calcified, restricted in spinal movement, or anatomically abnormal. Various studies have shown that the paramedian method is associated with higher first-attempt success, fewer

Address for correspondence: Dr. Nitin Krushnarao Nachane, Consultant Anaesthesiologist, Department of Anaesthesiology, Healing Hands Clinic, Pune, Maharashtra, India. E-mail: dr.nitin oxygen@gmail.com

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needle redirections, and fewer technical failures.^[5-8]

Although achieving sufficient sensory blockade is the optimal objective of spinal anaesthesia, patient-reported outcomes, including acceptance, comfort, and satisfaction, are becoming crucial measures of quality of care. The proctological surgeries usually involve the patient being in awkward postures, and the fear that he or she may have of inserting the needle in the spinal area may be quite effective in determining the entire experience of the procedure. Even with a final successful surgical anaesthesia, pain on needle insertion, retakes, and extended time of the procedure may adversely affect patient acceptance.

Although the literature available has made detailed comparisons between the midline and paramedian approaches in terms of technical success, block characteristics, and complications, there has been a relative lack of studies specifically examining patient acceptance and comfort, especially those involving anorectal surgery. Patient acceptance should also be measured, as a positive experience can help increase cooperation, decrease perioperative anxiety, and improve overall satisfaction with anaesthetic care.^[9]

As such, the current study aimed to compare patient acceptance of the paramedian and midline methods of spinal anaesthesia in patients undergoing proctological surgery. In evaluating pain during needle insertion, attempts made, ease of the procedure, and satisfaction, the study will provide evidence to inform anaesthesiologists in choosing the most patient-friendly method of spinal anaesthesia during anorectal surgery.

MATERIALS AND METHODS

Study Design and Setting: The study used a prospective comparative design and was carried out in the Department of Anaesthesiology at a tertiary care teaching hospital during the period between January and December 2025.

Sample Size: Eighty patients were invited to participate in it and were separated into two groups:

Group M: Midline approach to spinal anaesthesia (n=40).

##Only group P was eligible according to these criteria:

<|human>• Group P: Paramedian approach spinal anaesthesia (n=40)

Inclusion Criteria

- Patients aged 18–65 years
- ASA physical status I–II
- Elective anorectal surgeries (haemorrhoidectomy, fistulectomy, fissurectomy, etc.) to be performed.
- Informed consent, willing to do this.

Exclusion Criteria

- Patient refusal
- Coagulopathy or bleeding disorders
- Infection at the injection site
- Severe spinal deformities
- Allergy to local anaesthetics is known.

Methodology: Pre-anaesthetic assessment was done for all patients, and they were informed about the procedure of spinal anaesthesia. Normal surveillance was used. Spinal anaesthesia was done in the sitting position at L3-L4 or L4-

L5 interspace with a 25G Quincke spinal needle.

Midline approach: This needle goes through the supraspinous and interspinous ligaments and through the midline.

Paramedian approach: needle placed 1.5-2.0 cm lateral to the midline, through the approach that is directed medially and cephalad.

Hyperbaric bupivacaine 0.5% (33.5 ml) was administered to all patients.

Outcome Measures:

Answer: Patient acceptance measured with a 5-point Likert scale.

Secondary Outcomes:

- Pain score during needle insertion: VAS score.
- Number of attempts
- Time to successful block
- Problems (hypotension, PDPH, backache)
- Total patient satisfaction.

Statistical Analysis: SPSS 25.0 was used to analyse data. Continuous variables were reported as means \pm SD, and categorical variables as percentages. T-test and Chi-square test were applied to the students where necessary. The p-value considered statistically significant was below 0.05.

RESULTS

Demographic data for the patients and baseline clinical characteristics of the study groups are summarized in [Table 1]. Eighty patients undergoing elective anorectal surgery were randomly assigned to Group M (midline approach, n = 40) and Group P (paramedian approach, n = 40).

In Group M, the mean patient age was 42.611.2 years, whereas in Group P, it was 44.110.8 years. There was no statistically significant difference in age between the two groups (p = 0.52), indicating a similar age distribution. There was also little difference in gender distribution, with more males in both groups (28 males and 12 females in Group M, and 27 males and 13 females in Group P), and the difference was not significant (p = 0.82). There was no statistical difference between the groups in body mass index (BMI), with mean BMIs of 24.8 ± 3.1 kg/m² in the midline group and 25.2 ± 3.4 kg/m² in the paramedian group (p = 0.58). The physical status classification by the American Society of Anaesthesiologists (ASA) showed a similar distribution, with 26/14 patients in Group M and 25/15 in Group P (p = 0.81). Types of anorectal surgeries, such as haemorrhoidectomy, fistulectomy, and others, were also similar in the two cases, and no statistically significant difference was found (p = 0.97).

In general, [Table 1] shows that both groups experienced similar matches on demographics, physical condition, and type of surgery, which can guarantee differences in the further results as possible causes of dissociation with a spinal anaesthesia method, rather than with the demographic characteristics of patients.

[Table 2] presents comparative data on procedural aspects of spinal anaesthesia for the Midline (Group M) and paramedian (Group P) methods. The discussion of the results shows that there are significant differences in technical performance and process simplicity between the two groups.

The success rate was much higher in the paramedian group, where 82.5 percent of patients had successful dural puncture on

the first attempt, compared with 62.5 percent in the midline group. This differed statistically ($p = 0.04$), with the initial success rate being higher when using the paramedian technique.

There was a significant difference between Group P (1.3 ± 0.5) and Group M (1.8 ± 0.7) in terms of the mean number of attempts made to achieve successful spinal anaesthesia, and the p value was 0.002. This implies that the paramedian technique required fewer needle insertions, thereby enhancing procedural efficiency and the patient experience. The time you spent achieving a successful spinal block was also greatly reduced in the paramedian group. In Group P, the mean was 5.1125 minutes, and in Group M, it was 6.415 minutes, with a significant difference ($p = 0.001$). The shortened procedure time is also an indication of the technical convenience of the paramedian procedure.

This ease of landmark identification, as determined by the anaesthesiologist, was rated easy in 80% of the paramedian and 60% of the midline group of patients. This was statistically significant ($p = 0.05$), suggesting that anatomical access was better with the paramedial technique.

In general, [Table 2] indicates that the paramedian method of spinal anaesthesia has been shown to have higher first-attempt success rates, fewer needle attempts, shorter duration, and greater ease in landmark identification of lesions, compared with the midline approach in proctological operations.

[Table 3] compares patient-reported outcomes between midline (Group M) and paramedian (Group P) strategies for spinal anaesthesia regarding pain perception, acceptance, and overall satisfaction.

The visual analogue scale (VAS) measurements of pain associated with needle insertion were significantly lower in patients undergoing the paramedian method of spinal anaesthesia. Group M mean VAS was 4.6 ± 1.2 in comparison with Group P, 3.1 ± 1.0 . This was a statistically significant difference ($p < 0.001$) in procedural discomfort between the paramedian technique and the other techniques. Patient acceptance in the paramedian group was evaluated using a 5-point Likert scale. The average acceptance rating

was 4.3 ± 0.6 in Group P, compared with 3.6 ± 0.8 in Group M, with a p -value of less than 0.001. This finding indicates improved tolerance and readiness in patients undergoing spinal anaesthesia with the paramedian method.

Group P also had a higher proportion of patients satisfied with the anaesthetic procedure, with 85% satisfied, compared with Group M at 65%. The difference was statistically significant ($p = 0.04$), which, once again, on the issue of patient perspective, gave the paramedian approach the upper hand.

Overall, [Table 3] shows that the paramedian method of spinal anaesthesia is much more acceptable to the patient, has less pain when inserting needles, and generally is more satisfactory in relation to other methods when applied in patients who undergo morphine procedures to the anorectum.

[Table 4] presents a comparison of intraoperative and postoperative complication rates between the midline (Group M) and paramedian (Group P) methods of spinal anaesthesia.

Intraoperative hypotension was demonstrated in 15 per cent of patients in Group M and 12.5 per cent of patients in Group P. It was not statistically significant ($p = 0.74$), suggesting a similar haemodynamic profile between the two techniques. The incidence of bradycardia was 5% in the midline and 2.5% in the paramedian position, and the difference between them was not statistically significant ($p = 0.55$).

Regarding post-surgical complications, post-dural puncture headache (PDPH) occurred in 10% and 5% of patients in Groups M and P, respectively. Although the incidence in the paramedian group was lower, the difference was not statistically significant ($p = 0.39$). On the same note, 24 hours postoperatively, backache was observed in 12.5 percent of patients in the midline and 5 percent in the paramedian, with no significant difference ($p = 0.23$).

On the whole, [Table 4] suggests that the intraoperative and postoperative complication rates are similar for midline and paramedian spinal anaesthetic methods, with low rates. Although a lower complication rate was also observed in the paramedian group, the difference was not statistically significant, suggesting that the paramedian method may be as safe as the midline method in patients undergoing proctological surgery.

Table 1: Demographic Profile and Baseline Characteristics

Variable	Group M (Midline) n=40	Group P (Paramedian) n=40	p value
Age (years, mean \pm SD)	42.6 ± 11.2	44.1 ± 10.8	0.52
Gender (M/F)	28/Dec	27/13	0.82
BMI (kg/m ² , mean \pm SD)	24.8 ± 3.1	25.2 ± 3.4	0.58
ASA I / II	26 / 14	25 / 15	0.81
Type of surgery (Haemorrhoidectomy / Fistulectomy / Others)	18 / 14 / 8	17 / 15 / 8	0.97

Table 2: Procedural Characteristics of Spinal Anaesthesia

Parameter	Group M (Midline)	Group P (Paramedian)	p value
First-attempt success (%)	25 (62.5%)	33 (82.5%)	0.04*
Number of attempts (mean \pm SD)	1.8 ± 0.7	1.3 ± 0.5	0.002*
Time to successful block (min, mean \pm SD)	6.4 ± 1.5	5.1 ± 1.2	0.001*
Ease of landmark identification (Easy %)	24 (60%)	32 (80%)	0.05*

Table 3: Patient Acceptance and Pain Scores

Outcome Measure	Group M (Midline)	Group P (Paramedian)	p value
VAS pain score during needle insertion (mean \pm SD)	4.6 ± 1.2	3.1 ± 1.0	<0.001*
Patient acceptance score (Likert scale, mean \pm SD)	3.6 ± 0.8	4.3 ± 0.6	<0.001*
Overall satisfaction (Satisfied %)	26 (65%)	34 (85%)	0.04*

Table 4: Intraoperative and Postoperative Complications

Complication	Group M (n=40)	Group P (n=40)	p value
Hypotension	6 (15%)	5 (12.5%)	0.74
Bradycardia	2 (5%)	1 (2.5%)	0.55
Post-dural puncture headache	4 (10%)	2 (5%)	0.39
Backache at 24 hours	5 (12.5%)	2 (5%)	0.23

DISCUSSION

In the current study, there was no statistically significant difference in age between the midline (42.6 / 11.2) and paramedian (44.1 / 10.8) groups ($p = 0.52$). This observation of similar age distributions is consistent with previous studies on spinal anaesthesia, which found no significant age difference between midline and paramedian techniques. Indicatively, Baseline mean ages were also non-significant in other clinical comparisons of spinal approaches, consistent with the finding that age was not a confounding variable in procedural outcomes.^[10,11]

Our study had a distribution of males and females in groups, with a majority of males (Group M: 28/12; Group P: 27/13), and a comparable distribution of females ($p = 0.82$). Comparative studies comparing midline versus paramedian procedures have also indicated no significant gender imbalance between the two groups. For example, when comparing spinal methods anatomically, gender did not significantly differ between groups, suggesting that gender does not influence technical comparison or block success rate.^[10]

For body mass index (BMI), the two groups in our study showed similar results ($24.8 \pm 3.1 \text{ kg/m}^2$ vs $25.2 \pm 3.4 \text{ kg/m}^2$, $p = 0.58$). This observed finding is consistent with previous comparative spinal research, which found no significant difference in BMI between the midline and paramedian groups. Indicatively, an Indian prospective randomized comparison demonstrated no significant difference in the mean weights and BMIs of the techniques (statistically insignificant), implying that there was no technical difference in body habitus among patients across techniques. Our groups did not differ significantly in ASA physical status either ($p = 0.81$), indicating similar preoperative health conditions. Numerous comparative studies of spinal methods report similar distributions of ASA status, which helps ensure that any observed differences in results are not due to differences in initial health.^[11]

Finally, the number of (haemorrhoidectomy, fistulectomy, other) surgeries was also similar between the groups, and the number showed no significant difference ($p = 0.97$). Most comparative studies on the spinal area in the literature tend to focus on techniques rather than on a particular type of surgery; however, studies that provide data on the types of surgery used indicate that balanced surgical case-mix between groups is a popular methodological strength, limiting selection bias.^[11]

According to [Table 3], this study found that the paramedian method is more acceptable and comfortable for patients undergoing anorectal surgery than the midline method. Lower pain perception and fewer needle attempts can help increase satisfaction. The findings are consistent with the

past literature demonstrating the technical benefits of the paramedian technique, especially in patients with difficult anatomy.

Patient outcomes, including acceptance and satisfaction, have become widely accepted as quality dimensions in the practice of anaesthesia. The paramedian approach can be included as standard practice, thereby likely enhancing the patient experience, without impairing safety.

In our research, patients undergoing spinal anaesthesia with the paramedian method reported a very low pain rating during needle insertion (3.1 ± 1.0) compared with those in the middle group (4.6 ± 1.2), and this difference was highly significant ($p < 0.001$). Even though most comparative studies focus on procedural success and complications rather than pain scores during needle insertion, there is already evidence of a trend toward better procedural comfort or less tissue trauma with the paramedian method or its modification. The primary difference in patient satisfaction scores was observed to relate to lateral/paramedian variations in the randomized clinical trial comparing conventional and modified paramedian spinal techniques, thus providing a high level of overall comfort and acceptance, although direct VAS comparisons were not considered the major endpoint.^[12]

These results (higher patient acceptance scores and overall higher levels of satisfaction in the paramedian group) are consistent with the literature, which indicates that paramedian or modified paramedian practice is associated with positive patient-centered outcomes. An example of a paramedian technique modified and evaluated by a triple-blind randomized trial that was able to find a significantly increased level of satisfaction scores in the paramedian technique used against the traditional methods used ($p = 0.001$), found that the technical refinements in the technique used in the spine can be directly transferred to better patient experiences.

Even though most comprehensive meta-analyses focus on technical success and complication rates, they indirectly affect our findings, as lower procedural difficulty and fewer needle redirections are likely to enhance patient satisfaction and comfort. As an illustration, a meta-analysis of midline versus paramedian spinal anaesthesia showed that paramedian methods had fewer post-dural puncture headache and low back pain, which might adversely affect postoperative comfort and patient satisfaction, yet detailed subjective experience outcomes, such as VAS, were not the primary outcome measures examined.^[12]

On the contrary, other studies that considered postoperative back pain did not find any remarkable difference in the levels of pain between midline and paramedian techniques measured at later postoperative times (e.g., 24 h), but this does not contradict the differences of our peri-procedural pain scores, as midline and paramedian activities were measured at the end of the procedure.^[13]

Altogether, the reductions in VAS scores and the elevation in acceptance and satisfaction with the paramedian technique observed in our study are consistent with the existing evidence that technique selection and procedural comfort may determine subjective levels of comfort and experience during spinal anaesthesia. These trends justify the clinical significance of considering patient-centered outcomes alongside technical success metrics when choosing the method of choice for neuraxial blocks.

CONCLUSION

The paramedian method of spinal anaesthesia also comes with higher levels of patient acceptance and comfort than the midline method, where there is a proctology surgery. It may be regarded as a better method, particularly when the patient's comfort is a priority.

Limitations

- Single-center study
- Large sample size is comparatively small.
- Patient acceptance subjective evaluation.

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Conflicts of interest

There are no conflicts of interest.

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