Original Article

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Effect of Sacral Erector Spinae Plane Block on Postoperative Analgesia in Perianal Surgeries: A Randomised Controlled Trial

Anaesthesia Section

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ABSTRACT

Introduction: Sacral nerves emerge through sacral foramina and traverse below the multifidus muscle. Hence, blocking this myofascial plane can provide postoperative analgesia in the perianal region by blocking the sacral nerves supplying it.

Aim: To study the effect of Sacral Erector Spinae Plane Block (SESPB) on postoperative pain and postoperative analgesic requirement in perianal surgeries.

Materials and Methods: A randomised controlled trial was done with 60 patients who were randomly allocated into two groups (30 in each group). Group 1 patients received no intervention, whereas Group 2 received bilateral SESPB. The Visual Analogue Scale (VAS), opioid requirement, first analgesic demand, and additional analgesic requirement were compared between the two groups. The qualitative data was analysed by Student's t-test, whereas the quantitative data was analysed using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Results: Around 18 (60%) of the participants in group 1 were males, whereas group 2 consisted of 15 (50%) males. The mean age in group 1 was 40.7±11.5 years, whereas it was 43.6±12.7 years in group 2. The means of BMI were similar in both groups. The mean VAS score of group 1 was 3.19±0.23, whereas it was 2.37±0.25 in group 2. The first analgesic requirement was significantly delayed, and total tramadol requirement was lower in group 2 compared to group 1. Four patients from group 1 (control group) required inj. diclofenac sodium additionally.

Conclusion: Bilateral SESPB provided good postoperative analgesia in patients who underwent perianal surgery. The total analgesic requirement was also found to be lower with this block. Hence, it can be considered a modality for perianal surgeries.

Keywords: Nerve block, Pain management, Regional analgesia, Ultrasound-guided

INTRODUCTION

Analgesia and pain management during the postoperative period of any surgical procedure play an important role in patient satisfaction. Hence, continuous studies to develop safer alternatives to conventional anaesthetic procedures are always being attempted as better pain control modalities. Myofascial plane blocks under Ultrasonography (USG) guidance are safe to perform and provide results as good as peripheral nerve blocks. One such block involves blocking the sacral nerves. Anatomically, the sacral plexus is formed by the lumbosacral trunk and the ventral rami of the first, second, and third sacral nerves. This contributes to the pelvic aponeurosis or fascia. The sacral plexus innervates the skin of the medial part of the gluteal and posterior aspect of the thigh [1]. The perianal area is innervated by multiple sacral nerves leading to intense postoperative pain. These nerves emerge through sacral foramina and traverse below the multifidus muscle. By blocking this myofascial plane, the sacral nerves supplying the perianal area can be blocked. Hence this type of block reduces postoperative analgesic requirements and helps avoid related complications. These blocks can be included as part of multimodal analgesia to address patient expectations in pain management. The procedure of SESPB for pilonidal surgeries was first documented by Tulgar S et al., [2]. A new nomenclature was suggested by Hamilton DL as Sacral Multifidus Plane Block (MPB) for SESPB [3]. Several case reports and case series have reported that SESPB is effective in perianal pathology in countries other than India [4,5]. A case study from Tamil Nadu has examined the effects of this block on an Indian patient [6]. With this background, the present study was designed to explore the effect of SESPB on postoperative pain and analgesic requirements in perianal surgeries.

MATERIALS AND METHODS

This was a randomised double-blinded controlled study conducted at the Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, a tertiary care centre in eastern India, over an eight-month period from April 1 to December 26, 2021. Institutional ethics committee clearance was obtained via letter number KIIT/KIMS/IEC/578/2021. The study was registered in the Clinical Trials Registry of India (CTRI) (CTRI/2021/03/032331). Written informed consent was obtained from each patient before their enrollment in the study after explaining its purpose.

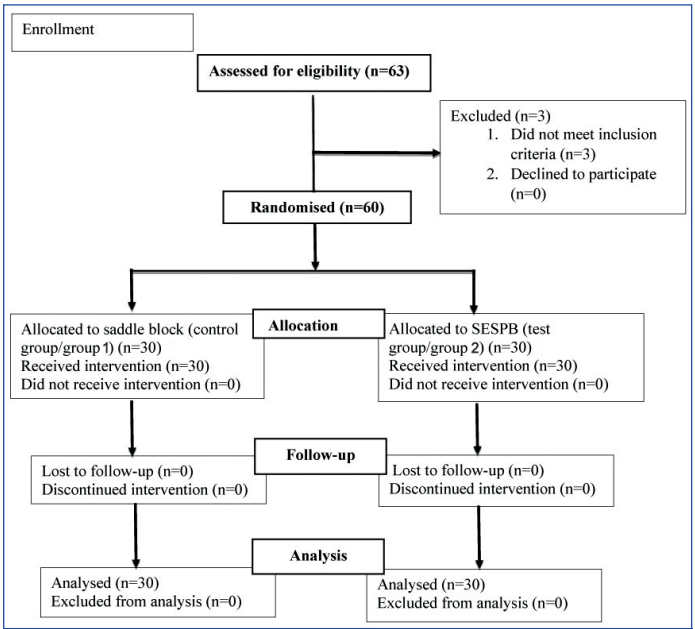
Inclusion criteria: All consenting patients of either genders, posted for elective perianal surgeries with American Society of Anaesthesiologists (ASA) classification I and II were included in the study.

Exclusion criteria: Patients with a history of drug abuse, known cases of diabetic neuropathy, chronic pain syndrome, site infections, or allergies to local anesthetics were excluded. Patients who underwent surgery under general anesthesia or neuraxial anesthesia requiring anesthetic infiltration around the Central Nervous System or infiltration anesthesia with sedoanalgesia were also excluded from the study.

Outcomes: The primary outcome was the mean Visual Analogue Score (VAS) score on the first postoperative day, which was assessed intermittently at fixed durations. The second outcome measure was the additional analgesic demand due to pain.

Randomisation: A total of 60 patients were included against the calculated sample size of 58 for both groups (29 each), considering a significance level of 0.05, power of 0.8, ratio of 1:1 for group 1 and group 2, allowable difference of 1, margin of 1, and a dropout rate of 1%. A rounded sample of 60 patients was enrolled in the study and randomly divided into two groups (30 patients in each group) using

a computer-generated randomisation list stored in opaque sealed envelopes. Participants were randomised in a 1:1 ratio to receive either a saddle block or SESPB [Table/Fig-1].



[Table/Fig-1]: CONSORT flow chart depicting participant progression.

It was a double-blind study in which the patients were unaware of the group to which they had been allocated. To blind the anaesthesiologists, interventions were performed by an anaesthesiologist not involved in the study. Surgeons, those providing intraoperative care, nursing staff, and investigators were blinded to the patient group allocation throughout the study.

The first group, group 1, served as the control group where patients were operated under a saddle block. Postoperatively, paracetamol was given thrice daily, and postoperative pain was managed with inj. tramadol as per the patient's demand.

The other group, named group 2, received bilateral USG-guided SESPB with 20 mL of 0.2% ropivacaine and 4 mg of dexamethasone on each side preoperatively. They were also operated under a saddle block. Postoperatively, paracetamol was given thrice daily, and postoperative pain was managed with inj. tramadol according to patient's demand. The postoperative pain and analgesic requirements were compared with the control group to assess the effectiveness of the block in managing postoperative pain.

Method: Under aseptic conditions, in the prone position, a linear ultrasound probe (Fujifilm Sonosite Edge II, 6-13 MHz) was placed over the spinous process of the lumbar vertebrae. The probe was then moved caudally in the sagittal plane to determine the beginning of the sacrum and locate the sacral medial crest. It was then moved laterally to identify the sacral intermediate crest and the multifidus muscle. In-plane, needling was performed using a 100 mm Stimuplex needle (21G short bevel; Stimuplex®, B. Braun, Germany). The needle was advanced in the craniocaudal direction until bone contact was achieved. After ensuring no blood aspiration, the drug mixture (20 mL of 0.2% ropivacaine with 4 mg of dexamethasone) was deposited. The craniocaudal spread of the injected drug was observed in real-time using the USG.

The same procedure was repeated on the other side. Surgery was conducted under saddle block with 1.2 mL of 0.5% bupivacaine heavy. Patients from both groups received inj. paracetamol 15 mg/kg i.v. (intravenous) every eight hours. The VAS was monitored postoperatively at the end of surgery. If the patient complained of pain and VAS was over three, the pain was treated with inj. tramadol 0.5 mg/kg slow i.v. over a period of two minutes. The VAS was then measured every 30 minutes on the first and second postoperative day, and the mean VAS score was considered for analysis. In case of VAS more than three, incremental doses of tramadol at a rate of 0.5 mg/kg up to a maximum of 2 mg/kg were given slow i.v. If the pain was still not controlled, the patient was treated with inj. diclofenac sodium 75 mg slow i.v.

STATISTICAL ANALYSIS

The Statistical Package for the Social Sciences (SPSS version 21.0 was used) software was used for data analysis. The data were analysed using the Student's t-test and Chi-square test. A p-value of ≤0.05 was considered statistically significant.

RESULTS

The patients who underwent perianal surgeries, after satisfying the inclusion and exclusion criteria, were divided into two groups depending on the anaesthetic drug they received. [Table/Fig-2] shows the comparison of socio-demographic variables of both groups and the duration of the surgeries they underwent with no statistically significant differences between them.

Variables		Group-1 (n=30) {frequency n in no. (%)}	Group-2 (n=30) {frequency n in no. (%)}	p-value
Gender	Male	18 (60)	15 (50)	0.436
	Female	12 (40)	15 (50)	
ASA status	I	13 (43)	11 (37)	0.598
	II	17 (57)	19 (63)	
	Mean±SD			
Age	(in years)	40.7±11.5	43.6±12.7	0.358
Body Mass Index (BMI)	(kg/m^2)	26.5±3.5	26.3±3.0	0.832
Duration of the surgery	(in minutes)	33.8±4.7	35.7±5.0	0.150

[Table/Fig-2]: Comparison of socio-demographic profile of the patients in both the groups and the duration of the surgery.
*Chi-square test was used as the test of association for gender and ASA status; #t-test was used as the test of association for age and BMI

[Table/Fig-3] illustrates the comparison of VAS scores and postoperative analgesic requirements of the patients in both groups. The VAS score at two hours was 2±0.2 in group 1 and 2 in group 2, while the VAS score at eight hours was 3.4±0.9 in group 1 and 2.4±0.6 group 2, which was also found to be statistically significant (p-value=0.0001). No statistically significant difference was found at the 48th hour between the two groups. The mean VAS score on the second postoperative day was 2.26±0.10 in group 1 and 0.96±0.16 in group 2.

Parameter	Group 1 (Mean±SD)	Group 2 (Mean±SD)	p-value
Mean VAS (1st postoperative day)	3.19±0.23	2.37±0.25	0.0001
Mean VAS (2nd postoperative day)	2.26±0.10	0.96±0.16	0.0682
First tramadol requirement (in hours after saddle block)	5.2±6.5	19.5±22.6	0.0001
Number of tramadol doses required (n in number of patients)	n=5 2.2±0.6	n=1 0.2±0.5	0.0001
Total dose of tramadol required (in mg)	156.7±34.1	11.7±25.2	0.0001
Patients requiring additional analgesic (Diclofenac Sodium) {n in no (%)}	4 (13.33%)	0	0.0001

[Table/Fig-3]: Comparison of VAS scores and postoperative analgesic requirement of patients in both the groups.
Chi-square test was used as the test of association for patients requiring additional analgesic; t-test was used as the test of association for all the other variables in the above table

It was observed that the mean VAS score on the first postoperative day, the number of doses of tramadol required, the amount of tramadol required, and the number of patients who required additional analgesic doses were significantly less in the group 2 compared to group 1. These differences were also found to be highly statistically significant (p-value=0.0001). None of the study participants in either group reported any complications.

DISCUSSION

In the current study, it was seen that the mean age of the patients in group 1 was 40.7±11.5 years, and in group 2 it was 43.6±12.7 years, which was comparable in both groups. The patients in both groups had a similar BMI of around 26.5±3 kg/m^2. The patients who received SESPB had a lower VAS score during the first postoperative day compared to the other group (2.37±0.25), and this difference was statistically significant. The first demand for analgesia with tramadol was significantly delayed in group 2 patients (19.5±22.6 hours) compared to group 1 (5.2±6.5 hours), also showing high statistical significance. This suggests that patients who received SESPB required analgesics at longer intervals than the other group. The results of this study regarding pain scores were consistent with Zhang Q et al., findings [7]. They reported that the mean NRS pain score at 12 hours postoperatively in the SESPB group was significantly lower than the other group (p-value=0.023). Pain scores were similar at 24 and 48 hours, differing from the current study where the SESPB group's pain score at 24 hours remained low. Zhang Q et al., observed that postoperative analgesic requirement (sufentanil) at 12 hours was significantly lower (p-value=0.020) in the SESPB group compared to the other group [7]. Similar findings regarding postoperative analgesic requirement were noted in the present study. The results in both groups of the aforementioned study were similar at 24 hours, since sufentanil is a short-acting drug and its analgesic effect would have decreased faster.

It was observed that there was no other analgesic requirement among the patients in group 2, whereas four patients in group 1 required an additional diclofenac sodium injection for postoperative pain. Another study by Bilge A and Ş ule A on two patients undergoing surgery for femoral fracture treatment through a posterolateral approach reported that SESPB was an effective method for postoperative analgesia; the patients did not complain of pain or need any analgesics for 24 hours, and their VAS scores were low [8]. A similar effect of SESPB was observed in the present study. The first analgesic demand was raised at the 25th postoperative hour, and tramadol 50 mg was administered to one patient, as reported by Bilge A and Şule A [8]. This result aligns with the findings of the current study, where analgesic demand was delayed in the SESPB group. The mean doses of tramadol required were significantly lower (11.7±25.2 mg) in group 2 compared to group 1 (156.7±34.1 mg), which was highly statistically significant. In a study by Chakraborty A et al., it was depicted that the SESPB block provided surgical anaesthesia for all study participants, with a median cumulative fentanyl requirement of 122 µg over 24 hours along with dermatomal loss of sensation for six hours [9]. Similar results are seen in the present study, but with tramadol requirement as the additional analgesic.

A retrospective study by Tulgar S et al., on patients in various age groups, ranging from 8-81 years, reported that the SESPB block was a good mode of postoperative analgesia for a variety of surgeries, except in two out of 182 patients who showed complications [10]. This result differs from the findings of the present study, as no such complications have been reported by the study participants. A case study by Chao AP et al., reported that SESPB promoted a comfortable postoperative course and timely discharge for a paediatric patient who had received the SESPB [11]. It was shown to provide safe analgesia for a paediatric patient, suggesting safety in other age groups as well, unlike in the present study. In a study by Abdelhamid K et al., it was observed that SESPB resulted in decreased analgesic and opioid requirements in patients who received it, with pain scores of 0-2/10 post-SESPB and no reported complications [12]. The present study participants also did not experience any complications in the postoperative period, aligning with the results of this study. A similar article by Kilicaslan A et al., suggested that sacral ESPB provided effective postoperative analgesia for sacroiliac fixation surgery, with good dermatomal division of the block providing effective analgesia in the study participants, eliminating the need for analgesics up to 12 hours postsurgery [13]. These results are consistent with the findings of the present study. Results from various case reports, narrative reviews, and randomised controlled trials revealed that this block can be utilised in various types of surgeries due to its efficacy in providing postoperative analgesia [14-20].

Limitation(s)

The sensory loss in SESPB patients was not assessed as it would have altered blinding. This was a single-centre study with restricted inclusion criteria; hence, the results of the study lack generalisability to apply this mode of analgesia to patients with other specific co-morbid conditions.

CONCLUSION(S)

The efficacy of SESPB in perianal surgeries was found to be good. The pain score was lower compared to other anaesthesia modalities, and the analgesic demand in the postoperative period was also low in patients receiving SESPB. Hence, it can be used as an effective modality for surgeries involving the perianal region. More studies on immediate complications, delayed complications, and its use in different age groups should be taken up to establish its efficiency with evidence.

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