Section: Anaesthesiology

Original Research Article

A COMPARATIVE STUDY OF THE OUTCOME OF SUBARACHNOID BLOCK IN SITTING POSITION VERSUS TRADITIONAL CROSSLEGGED POSITION IN EMERGENCY CESAREAN SECTION: A RANDOMISED CONTROL STUDY

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ABSTRACT

Background: Subarachnoid block (SAB) is the preferred anaesthetic technique for caesarean section. Patient positioning plays a crucial role in the success of SAB, especially in parturients where anatomical and physiological changes may increase procedural difficulty. The cross-legged position (CLP) has been proposed as an alternative to the traditional sitting position (TSP) to improve lumbar flexion and ease of needle insertion. The Objective is to compare the number of attempts required for successful SAB between TSP and CLP in parturients undergoing emergency caesarean section

Materials and Methods: This prospective interventional study included 100 parturients undergoing emergency caesarean section, randomly allocated into two groups: TSP (n=50) and CLP (n=50). SAB was administered using 0.5% hyperbaric bupivacaine. The primary outcome was the number of attempts required for successful block. Secondary outcomes included ease of landmark palpation, patient comfort, needle–bone contact, incidence of bloody tap, duration of needle insertion, onset of sensory block, and block level. Statistical analysis was performed using independent t-test and Chi-square test, with $p<0.05$ considered significant.

Results: First-attempt success was significantly higher in the CLP group compared to the TSP group (64% vs 32%, $p<0.001$). CLP was associated with better landmark palpation (74% vs 30%, $p=0.001$), improved patient comfort (68% vs 46%, $p=0.02$), reduced needle–bone contact (32% vs 68%, $p=0.0003$), and lower incidence of bloody tap (6% vs 26%, $p=0.006$). The duration of needle insertion and onset time of sensory block were significantly shorter in the CLP group ($p<0.001$). Sensory block level was comparable between groups.

Conclusion: The cross-legged position improves the ease and success of SAB compared to the traditional sitting position in parturients undergoing emergency caesarean section.

Keywords: Subarachnoid block, spinal anaesthesia, cross-legged position, traditional sitting position, caesarean section, obstetric anaesthesia.

INTRODUCTION

Subarachnoid block (SAB) is the preferred anaesthetic technique for caesarean section due to its rapid onset, reliability, and improved maternal safety compared to general anaesthesia. Its success depends largely on accurate needle placement, which is significantly influenced by patient positioning. Inadequate positioning can lead to difficulty in landmark identification, multiple attempts, and increased risk of complications such as post-dural puncture headache and back pain.[1]

The traditional sitting position (TSP) is commonly used but may be suboptimal in parturients due to pregnancy-related changes such as exaggerated lumbar lordosis and labour pain, which limit spinal flexion and narrow interspinous spaces.[2] The cross-legged position (CLP) has been proposed to improve lumbar flexion through posterior pelvic tilt, thereby facilitating easier needle insertion and improving procedural success.[3]

This study was undertaken to compare the outcomes of SAB between TSP and CLP in parturients undergoing emergency caesarean section, with primary focus on the number of attempts required for successful block.

Aims and Objectives

The primary objective of this study was to compare the number of attempts required for successful subarachnoid block (SAB) in parturients positioned in the traditional sitting position (TSP) versus the cross-legged position (CLP).

Secondary objectives included comparison of ease of landmark palpation, patient comfort, needle–bone contact, incidence of bloody tap, time taken for spinal needle insertion, onset of sensory block, and perioperative complications between the two positions.

MATERIALS AND METHODS

This prospective interventional study was conducted in the Department of Anaesthesiology at P.E.S. Institute of Medical Sciences and Research, Kuppam, over a period of 18 months. A total of 100 parturients scheduled for emergency caesarean section under spinal anaesthesia were enrolled and randomly allocated into two groups of 50 each using a lottery method: Group TSP (traditional sitting position) and Group CLP (cross-legged position).

Parturients aged 18–35 years, belonging to American Society of Anesthesiologists (ASA) physical status II, with singleton pregnancies were included. Patients with spinal deformities, BMI >30 kg/m², hypertensive disorders, diabetes mellitus, bleeding disorders, or major obstetric complications were excluded.

All patients underwent pre-anaesthetic evaluation and standard monitoring including ECG, non-invasive blood pressure, and SpO_2 . Intravenous access was secured, and patients were preloaded with intravenous fluids. Under aseptic precautions, subarachnoid block was administered using a 25-gauge Quincke spinal needle with 2 ml of 0.5% hyperbaric bupivacaine.

The number of attempts required for successful SAB was recorded as the primary outcome. Secondary parameters assessed included ease of landmark palpation, patient comfort, needle–bone contact, incidence of bloody tap, duration of spinal needle insertion, onset of sensory block, and maximum sensory block level achieved. Hemodynamic parameters were monitored throughout the procedure, and complications such as hypotension and bradycardia were managed as per standard protocols.

Data were analyzed using SPSS version 23.0. Continuous variables were expressed as mean ± standard deviation and compared using the independent t-test. Categorical variables were analyzed using the Chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 100 parturients undergoing emergency caesarean section were included in the study, with 50 patients each in the Traditional Sitting Position (TSP) group and Cross-Legged Position (CLP) group.

The baseline demographic and clinical characteristics of both groups were comparable, as depicted in [Table 1]. There was no statistically significant difference between the groups with respect to age, height, weight, and ASA physical status. However, the mean body mass index (BMI) was significantly higher in the TSP group compared to the CLP group ($p = 0.015$).

With regard to the primary outcome, a significantly higher proportion of patients in the CLP group achieved successful subarachnoid block on the first attempt compared to the TSP group (64% vs 32%), as shown in [Table 2]. In contrast, more patients in the TSP group required more than two attempts (34% vs 8%). This difference was statistically highly significant ($p < 0.001$).

Ease of landmark palpation was significantly better in the CLP group, with 74% of patients having easily palpable landmarks compared to 30% in the TSP group ($p = 0.001$). Similarly, patient comfort was higher in the CLP group (68% vs 46%, $p = 0.02$), as depicted in [Table 2].

Procedural characteristics also favored the CLP group. Needle–bone contact was observed in 68% of patients in the TSP group compared to 32% in the CLP group ($p = 0.0003$). The incidence of bloody tap was significantly lower in the CLP group (6% vs 26%, $p = 0.006$). The mean duration of spinal needle insertion was significantly shorter in the CLP group (16.54 ± 1.70 seconds) compared to the TSP group (25.42 ± 2.30 seconds) ($p < 0.001$). Additionally, the time to onset of sensory block was shorter in the CLP group (3.05 ± 0.05 minutes) compared to the TSP

group (3.50 ± 0.16 minutes), which was statistically significant ($p < 0.001$), as shown in [Table 2].

The maximum sensory block level achieved was comparable between both groups, with no statistically significant difference ($p = 0.97$), as depicted in [Table 2].

Overall, the cross-legged position demonstrated improved procedural ease, higher first-attempt success rates, and fewer complications compared to the traditional sitting position.

Table 1: Baseline Demographic and Clinical Characteristics

Parameter	TSP (n=50)	CLP (n=50)	P value
Age (years), mean ± SD	26.96 ± 2.02	27.54 ± 1.70	0.209
Height (cm), mean ± SD	152.46 ± 1.70	154 ± 1.43	0.21
Weight (kg), mean ± SD	64.12 ± 5.72	61.32 ± 7.81	0.113
BMI (kg/m²), mean ± SD	27.59 ± 2.48	25.86 ± 3.32	0.015*
ASA I / II / III (n)	10 / 30 / 10	12 / 25 / 13	0.59

Table 2: Comparison of Procedural and Outcome Parameters

Parameter	TSP (n=50)	CLP (n=50)	P value
Number of attempts			<0.001*
1 attempt	16 (32%)	32 (64%)	
2 attempts	17 (34%)	14 (28%)	
>2 attempts	17 (34%)	4 (8%)	
Ease of landmark palpation			0.001*
Easy	15 (30%)	37 (74%)	
Difficult	24 (48%)	12 (24%)	
Impossible	11 (22%)	1 (2%)	
Patient comfort			0.02*
Comfortable	23 (46%)	34 (68%)	
Uncomfortable	27 (54%)	16 (32%)	
Needle–bone contact	34 (68%)	16 (32%)	0.0003*
Bloody tap	13 (26%)	3 (6%)	0.006*
Duration of needle insertion (sec)	25.42 ± 2.30	16.54 ± 1.70	<0.001*
Time to sensory onset (min)	3.50 ± 0.16	3.05 ± 0.05	<0.001*
Maximum sensory level (T5/T6/T7)	16/17/17	17/17/16	0.97

DISCUSSION

The present study demonstrates that the cross-legged position (CLP) significantly improves the ease and success of subarachnoid block (SAB) compared to the traditional sitting position (TSP) in parturients undergoing emergency caesarean section. The higher first-attempt success rate in the CLP group suggests that improved lumbar flexion and posterior pelvic tilt enhance access to the subarachnoid space. Similar findings were reported by Manggala SK et al,[4] who showed fewer needle–bone contacts and improved first-pass success with the crossed-leg sitting position.

Ease of landmark palpation and patient comfort were significantly better in the CLP group, likely due to reduction in lumbar lordosis and improved interspinous space widening. Ultrasonographic studies by Sharma M et al,[5] and Aksu F et al, [6] have demonstrated increased interspinous distance in flexed or lotus-type positions, supporting the anatomical advantage of CLP. Improved comfort and stability also enhance patient cooperation, which is critical in labouring parturients. Soltani Mohammadi S et al,[7] similarly emphasized that modified sitting positions improve procedural ergonomics without compromising effectiveness.

The CLP group also showed significantly reduced needle–bone contact and lower incidence of bloody tap, indicating a more direct needle trajectory and less tissue trauma. Comparable findings have been reported by Jadoon H,[8] highlighting the role of positioning in reducing procedural difficulty. Furthermore, the shorter needle insertion time and faster onset of sensory block observed in this study are clinically relevant in emergency caesarean sections. Chowdhary N et al,[9] also reported improved procedural efficiency with modified sitting positions.

Despite these advantages, the maximum sensory block level achieved was comparable between the two groups, suggesting that patient positioning primarily influences technical ease rather than block characteristics. These findings are consistent with standard anaesthesia literature, which indicates that factors such as drug dose, baricity, and CSF dynamics determine block height.[10,11] Overall, the present study supports CLP as a simple, effective, and clinically advantageous alternative to TSP in obstetric spinal anaesthesia.

Limitations: The study was conducted in a single centre with a relatively small sample size, which may limit generalizability. Operator-dependent factors and lack of blinding could have influenced procedural outcomes. Further multicentric studies with larger sample sizes are recommended to validate these findings.

CONCLUSION

The cross-legged position (CLP) significantly improves the ease and success of subarachnoid block

compared to the traditional sitting position in parturients undergoing emergency caesarean section. It is associated with higher first-attempt success rates, better landmark palpation, and improved patient comfort. CLP also reduces needle–bone contact and incidence of bloody tap, indicating less procedural trauma. Additionally, it shortens the duration of needle insertion and facilitates faster onset of sensory block, which is crucial in emergency settings. Despite these advantages, the level of sensory block achieved remains comparable between both positions. Overall, CLP is a simple, effective, and clinically advantageous alternative to TSP in obstetric spinal anaesthesia.

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