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Original Research Article

An approach to reduce labor pain and increase vaginal birth rate

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ABSTRACT

Background: Labor pain is considered one of the most intense pains experienced by women. Effective pain management is crucial in enhancing maternal satisfaction and ensuring a positive childbirth experience. The peri-pudendal block (PPB) is a promising alternative to conventional pain management strategies during the second stage of labor. This study evaluated the efficacy of the peri-pudendal block in reducing labor pain, episiotomy rates, and improving maternal and neonatal outcomes.
Methods: A prospective randomized controlled trial was conducted at BRD Medical College, Gorakhpur, involving 206 women with term pregnancies. Participants were divided into two groups: those receiving PPB (n=107) and those receiving standard care (n=99). Visual analogue scale (VAS) scores, duration of the second stage of labor, episiotomy rates, perineal injuries, and neonatal outcomes (APGAR scores) were assessed.
Results: PPB significantly reduced VAS scores in both primiparous and multiparous women (4.61±0.12 and 4.36±0.78, respectively). The second stage of labor was shorter in the PPB group for both primiparous (51.52±5.80 minutes) and multiparous women (24.49±4.23 minutes). Episiotomy rates were significantly lower in the PPB group (63% for primiparous and 26.4% for multiparous women). No significant differences in neonatal APGAR scores or maternal cardiovascular parameters were observed.
Conclusions: The peri-pudendal block is a safe and effective analgesic option during labor, improving maternal comfort and reducing surgical interventions without compromising neonatal outcomes.

Keywords: APGAR score, Episiotomy, Labor analgesia, Pain management, Peripudendal block

INTRODUCTION

Childbirth is a multifaceted experience involving significant physical and emotional components. Labor pain, considered one of the most intense pains experienced by women, varies greatly among individuals, with nulliparous women often reporting higher pain intensity than multiparous women.[1] Inadequate pain management can negatively impact the childbirth experience, potentially leading to postpartum complications, psychological distress, and increased cesarean section rates.[2]

The pudendal nerve block, a traditional method of labor analgesia, has been overshadowed by the rise of epidural analgesia due to technical complexity and potential risks.[3] However, the peri-pudendal block (PPB), a simplified variation of the pudendal block, has emerged as a viable alternative for managing pain in the second stage of labor. Unlike conventional methods, PPB requires minimal drug dosage and is less invasive, providing effective pain relief with reduced risk of complications.[4]

Aims and objectives

This study investigated the efficacy of PPB in reducing labor pain, minimizing episiotomy rates, and enhancing neonatal outcomes, aiming to establish it as a safe and effective intervention for labor analgesia.

METHODS

Study design

This prospective randomized controlled trial was conducted over one year (March 2023 to February 2024) at BRD Medical College, Gorakhpur.

Participants

A total of 206 women with single-term pregnancies and cephalic presentations were included. Participants were divided into two groups: group A (PPB, n=107) and group B (standard care, n=99).

Inclusion criteria

The study included singleton term pregnancy, age 18-35 years, cephalic presentation with no cephalopelvic disproportion, participant in second stage of labor with fully dilated cervix, period of gestation 37 weeks or more,consent for PPB, normal past medical and obstetrics history.

Exclusion criteria

Twin/malpresentation, preterm, antepartum hemorrhage, any history of uncompensated medical complications, medical contraindications to PPB, fetal distress, foetal malformations.

Procedure

PPB was administered during the second stage of labor using 4 ml of 1% adrenaline-free lidocaine on each side near the ischial spine. Pain relief was assessed using the visual analogue scale (VAS), while labor progression was monitored using partographs. Neonatal outcomes were evaluated using the APGAR scoring system.

Outcome measures

Primary outcomes were VAS scores, duration of the second stage of labor. Secondary outcomes were episiotomy rates, perineal injuries, neonatal APGAR scores.

Statistical analysis

Data were analyzed using t-tests and chi-square tests for continuous and categorical variables, respectively. A p value <0.05 was considered statistically significant.

RESULTS

Demographics and clinical parameters

No significant differences were observed in age, BMI, gestational weeks, or fetal weight between the two groups, ensuring comparability (Table 1).

Table 2 represents the balanced distribution of obstetrics status among participants who underwent peripudendal block during the study.

Table 1: Statistical comparison of demographic and clinical data of the studied subjects (n=206).

Particulars	Primiparous		P value (t-test)	Multiparous		P value (t-test)
	Without PPB	With PPB		Without PPB	With PPB	
Age (average years)	23.63±2.49	23.28±2.61	0.484	25.88±3.40	26.49±3.37	0.364
Weight (average kg)	60.02±4.59	59.48±4.82	0.560	59.71±5.50	59.72±5.13	0.993
Height (average centimetre)	151.35±4.37	150.33±4.58	0.247	151.27±4.81	150.15±5.02	0.257
BMI (average score)	26.23±2.18	26.37±2.55	0.754	26.12±2.46	26.56±2.83	0.407
Pregnancy week (average)	38.47±1.15	38.74±1.11	0.226	38.46±1.45	38.72±1.26	0.342
Fetal weight (average kg)	2.71±0.34	2.83±0.38	0.101	2.95±0.384	2.90±0.41	0.572

Table 2: Distribution of obstetrics status of study participants underwent peri pudendal block (n=206).

		Peri pudendal block		Total
		Yes	No	
Obstetrics status	Primiparous	54	51	105
		51.4%	48.6%	100.0%
	Multiparous	53	48	101
		52.5%	47.5%	100.0%
Total		107	99	206
		51.9%	48.1%	100.0%

Pain reduction

PPB significantly reduced pain levels in both primiparous and multiparous women (p<0.001). Average VAS scores for PPB were 4.61±0.12 in primiparous women and 4.36±0.78 in multiparous women, compared to 5.47±1.19 and 5.94±0.932, respectively, in the control group (Table 3).

Table 3: Association of VAS and duration of second stage of labour in primiparous and multiparous study subjects underwent peri pudendal block (n=206).

Particulars	Primiparous		P value (t-test)	Multiparous		P value (t-test)
	Without PPB	With PPB		Without PPB	With PPB	
Visual analogue score (average)	5.47±1.19	4.61±0.12	<0.001*	5.94±0.932	4.36±0.78	<0.001*
Duration of second stage labour (average minutes)	81.55±13.3	51.52±5.80	<0.001*	39.44±4.57	24.49±4.23	<0.001*

*Statistically significant.

Table 4: Correlation of VAS and duration of second stage of labor underwent peri pudendal block.

Peri pudendal block	Correlates	Correlation coefficient (r)	P value
Yes	VAS Duration 2nd stage labor	0.133	0.171
No	VAS Duration 2nd stage labor	-0.251	0.012*

*Statistically significant.

Table 5: Rate of episiotomy and perineal and/or vaginal injuries depending on whether peri pudendal block was used or not (n=206).

Particulars	Primiparous			Multiparous		
	Without PPB N (%)	With PPB N (%)	P value#	Without PPB N (%)	With PPB N (%)	P value#
With episiotomy	51 (100)	34 (63)	<0.001*	26 (54.2)	14 (26.4)	0.008*
Without injury	47 (64.4)	26 (35.6)		26 (100)	14 (100)	
With injury	4 (33.3)	8 (66.7)		0 (0.0)	0 (0.0)	
Without episiotomy	0 (0.0)	20 (37)		22 (45.8)	39 (73.6)	
Without injury	0 (0.0)	16 (100)		20 (90.9)	33 (84.6)	
With injury	0 (0.0)	4 (100)		2 (9.1)	6 (75)	
Total	51 (100)	54 (100)		48 (100)	53 (100)	
Without injury	47 (92.2)	42 (77.8)		46 (95.8)	47 (88.7)	
With injury	4 (7.8)	12 (22.2)		2 (4.2)	6 (11.3)	
Operative suture is necessary because of episiotomy or injury	42 (82.4)	38 (70.4)	0.150	28 (58.3)	26 (49.1)	0.351

*Statistically significant.

Table 6: Association of APGAR score among primiparous and multiparous underwent peri pudendal block (n=206).

Particulars	Primiparous		P value (t-test)	Multiparous		P value (t-test)
	Without PPB	With PPB		Without PPB	With PPB	
APGAR score (average)	6.65±0.71	6.87±0.67	0.103	7.17±0.78	6.87±1.22	0.152

Table 7: Association of cardiac parameters before and after delivery underwent peri pudendal block among study subjects (n=206).

Particulars		Peri pudendal block		P value (t-test)
		Yes	No	
Systolic blood pressure	Pre delivery	113.27±5.62	113.68±5.4	0.604
	Post delivery	113.20±5.61	113.26±5.8	0.994
Diastolic blood pressure	Predelivery	74.77±5.01	74.55±5.00	0.752
	Postdelivery	72.34±5.75	71.52±6.28	0.329
Pulse rate	Predelivery	84.56 2.89	84.87±3.03	0.608
	Postdelivery	90.06±8.96	90.73±10.21	0.618

Labor duration

The second stage of labor was significantly shorter in the PPB group for primiparous (51.52±5.80 minutes) and multiparous women (24.49±4.23 minutes) compared to controls (81.55±13.38 and 39.44±4.57 minutes, respectively) ($p<0.001$) (Table 3).

This study examined the correlation between visual analogue score and the duration of second stage of labour in woman who underwent a periportal block compare to those who did not (Table 4).

Episiotomy and perineal injuries

Episiotomy rates were lower in the PPB group (63% in primiparous and 26.4% in multiparous women). However, the PPB group had a higher incidence of perineal injuries, likely due to reduced surgical interventions (Table 5).

Neonatal outcomes

APGAR scores showed no significant differences between the two groups, with average scores of 6.87±0.67 (PPB) and 6.65±0.71 (control) for primiparous women. Multiparous women showed similar results (Table 6).

Cardiovascular parameters

No significant differences in maternal systolic or diastolic blood pressure or pulse rate were noted pre- or post-delivery between groups (Table 7).

DISCUSSION

Our findings align with previous studies highlighting the efficacy of PPB in managing labor pain. Maternal age, weight, BMI and height were not significant factors influencing PPB use, as supported by Heller et al study, Martinez et al study and Johnson et al study.[5-7] Reduced VAS scores in the PPB group demonstrate its effectiveness in alleviating second-stage labor pain. These results corroborate Anim-Somuah et al study, who emphasized the role of regional anesthesia in pain management.[8] The shorter duration of the second stage of labor observed in the PPB group supports findings by Jones et al study, attributing effective pain management to improved labor progression.[9] The rate of episiotomy and the incidence of perineal and/or vaginal injuries in primiparous and multiparous women indicates that the use of PPB is associated with significant reductions in episiotomy rates among both primiparous and multiparous women. Specifically, 63% of primiparous women who received PPB underwent episiotomy. Among multiparous women, 26.4% of those who received PPB had an episiotomy and the findings were supported by Beke study.[10] However, there was a higher incidence of perineal and vaginal injuries in this group, consistent with findings by Alexander et al study.[11] They observed a decreased need for episiotomy with peri-pudendal anesthesia but noted that it does not eliminate the risk of perineal trauma. Factors such as delivery technique and maternal tissue characteristics play pivotal roles in determining injury incidence. These results align with more studies, such as Kettle et al study and Carroli and Mignini study, which also reported that regional anesthesia, including PPB, can effectively reduce the need for episiotomies.[12,13] Conversely, the study found an increased incidence of perineal injuries among women who received PPB. This suggests that while PPB reduces episiotomy rates, it may be associated with a higher risk of spontaneous perineal tears, a phenomenon noted by Carroli et al study.[13] The absence of adverse effects on neonatal APGAR scores and maternal cardiovascular parameters reinforces PPB's safety profile, consistent with Roberts et al study.[14]

This study's strengths include a robust randomized design and adequate sample size. However, single-center data may limit generalizability, and longer-term outcomes were not assessed.

CONCLUSION

Peri-pudendal block is an effective, safe, and feasible analgesic option for managing labor pain, reducing episiotomy rates, and enhancing maternal comfort. Its integration into obstetric practice is recommended to improve childbirth experiences without compromising neonatal outcomes.

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