ORIGINAL ARTICLE

Effectiveness of Transversus Abdominis Plane (TAP) Block for Pain Management after Caesarean Section

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ABSTRACT

Background: Pain after cesarean section is usually described as moderate to severe by most patients and failure to adequately treat may affect mother-baby bonding, care of baby, and breastfeeding.
Aim: To evaluate the effectiveness of Transversus Abdominis Plane block, in terms of mean pain score (using visual analogue score), in patients undergoing elective caesarean section.
Study design: Randomized Control Trial
Setting: Department of Anesthesiology, Lahore General Hospital, Lahore
Duration of study: September 2016 to February 2017
Methods: 144 patients fulfilling the inclusion and exclusion criteria, were enrolled and randomly assigned to two groups. In Group A, the bilateral TAP block was performed, at the end of surgery, by using 20 ml of ropivacaine 0.25%, bilaterally. In Group B (control group), TAP block was not given. A standard postoperative analgesic regimen consisting of inj Ketorolac 30mg I/V bid was commenced on admission to the PACU in both groups. The pain score, using Visual Analogue Score (VAS) after 24 hours were assessed.
Results: The mean age of patients in group A was 26.01±4.17 years and of group B was 26.92±3.74 years. The mean pain score using Visual Analogue Scale (VAS) at 24 hours was significantly lower i.e. 2.82±0.83 in patients treated with Abdominal Plane Block and 5.01±1.03 in control group (p-value < 0.005).
Conclusion: Our study suggests that TAP block provides better postop analgesia, in terms of VAS score, after caesarean section.
Keywords: Regional anesthesia, Caesarean section, Analgesia, transverses abdominal plane block.

INTRODUCTION

Post-operative pain is one of the most important factor determining the outcome of the surgical procedure, especially in case of abdominal surgeries. Caesarean section, being the most commonly performed abdominal surgery and involving two (or more) lives, often poses challenges of pain management during the postoperative period[1]. Poorly managed postoperative pain, after caesarean delivery, can lead to delayed mobilization, difficulty in (or refusal from) breastfeeding and maternal depression, all of which can lead to delayed maternal bonding[2].

Various modalities (alone or in combination) have been in use since long, for postoperative pain management, including the use of opioids (and derivatives), Non-steroidal anti-inflammatory drugs, local infiltration of local anaesthetic drugs and local blocks[3,4].

Transversus Abdominus Plane (TAP) block is one of the local blocks, used to manage postoperative pain after caesarean section and other lower abdominal surgeries, with a variable duration of effect (12-36 hours)[5]. TAP has previously been studied, with varying degree of success. McMorrow SM reported a higher mean pain score in TAP group (4.4±2.67) as compared to control group (3.73±1.94)[1]. Costello JF found that the mean visual analogue scale pain scores, on movement at 24 hours postoperative, were not different between the TAP block and placebo groups (3.4±2.4 and 3.2±2.2 respectively, p = 0.47).[6]Carney J et al, in two different studies, documented that TAP provides an effective analgesia, after abdominal surgeries[7,8].
Non-availability of data from local studies (and international studies suggesting variable success), led us to design this study to evaluate the effectiveness of TAP, in the management of postoperative pain in patients undergoing elective caesarean section under spinal anaesthesia.

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METHODS

After approval from hospital ethical committee, this randomized controlled trial was conducted at Department of Anaesthesiology, Lahore General Hospital Lahore, from September 2016 to February 2017. 144 patients, who were planned for elective caesarean section, were enrolled in the study using non-probability purposive sampling technique. An informed written consent explaining the purpose of the study and the process of randomization was obtained from all the participants. Patients with ASA grading 3 or worse, BMI of 35 or more and patients who refused for spinal anaesthesia or had a contraindication for spinal anaesthesia were not included in the study. After obtaining the demographic data i.e., age and BMI and history regarding parity and previous surgery, block method was used to assign the patient to one of the two study groups (group A and group B). On their arrival in operating room, patient monitoring (ECG, NIBP and Pulse-oximetery) was applied as per standard protocol. All the patients received spinal anaesthesia, by a trained and qualified anaesthetist. In group A, at the end of the surgery, patients received bilateral TAP block through instillation of 20ml of 0.25% ropivacaine, using loss of resistance technique.TAP block was performed by a qualified anaesthetist, to ensure the quality and equality of the procedure in all the patients. In group B (control group), patients did not receive any block. Postoperatively, patients were monitored in post-anaesthesia care unit (PACU) for 24 hours. A standard postoperative analgesia, consisting of Ketorolac trometamol 30mg, at 12 hourly intervals, was provided to all the patients, in both groups. All the patients were monitored for postoperative pain, at 24 hours, using an 11 points Visual analogue scale (0 meant no pain and 10 meant severe, agonizing and unbearable pain). All the data was recorded using a predesigned proforma and was analyzed using SPSS version 23.

RESULTS

Mean age in both groups was almost similar (26.01±4.17 years in group A and 26.92±3.74 in group B). 59(81.9%) patients in group A and 49 (68.1%) patients in group B had 0-2 pregnancies, whereas 13(18.1%) patients in group A and 23 (31.9%) in group B had 3-5 pregnancies. The mean BMI were also found to be similar in both groups i.e., 28.74±3.56 in group A and 29.72±3.90 in group B. The mean pain score on Visual Analogue Scale (VAS), at 24 hours, was, however lower (2.82±0.83) in group A patients (who received TAP Block with ropivacaine) compared to(5.01±1.03) in group B patients (control group) with $P < 0.005$.

Stratified analysis of mean pain score on VAS versus age groups (18-29 years and 30 or above), parity (nulliparas to para 2 and para 3-5) and BMI (<30 and >30) showed that VAS score was significantly lower in TAP group, for all strata, when compared to control group ($P < 0.001$, for all, age, parity and BMI subgroups).

Table1: Age, parity, BMI and VAS Score in study groups

Study Group	N	Age (Mean ±SD)	Age Group		Parity		BMI (Mean ±SD)	BMI		VAS Score (Mean ±SD)
			18-29 Years	30-40 Years	0-2	3-5		<30	≥30	
A	72	26.04 (±4.17)	58 (80.6%)	14 (19.4%)	59 (81.9%)	13 (18.1%)	28.74 (±3.56)	41 (56.9%)	31 (43.1%)	2.82 (±0.83)
B	72	26.92 (±3.74)	51 (70.8%)	21 (29.2%)	49 (68.1%)	23 (31.9%)	29.72 (±3.90)	35 (48.6%)	37 (51.4%)	5.01 (±1.03)

Table 2: Stratified analysis of VAS score versus age group, parity and BMI

		Study Group	Mean VAS score	S.D. (±)	P-value
Age group	18-29	A	2.76	0.84	<0.001
		B	5.06	0.95	
	30-40	A	3.07	0.73	<0.001
		B	4.90	1.22	
No pregnancy	0-2	A	2.67	0.79	<0.001
		B	5.04	0.99	
	3 – 5	A	3.46	0.66	<0.001
		B	4.95	1.11	
BMI	< 30	A	2.76	0.92	<0.001
		B	5.02	1.09	
	> 30	A	2.90	0.70	<0.001
		B	5	0.97	

DISCUSSION

In current study, we found similar mean age in both groups that is mean age of patients in group A was 26.01±4.17 years and of group B was 26.92±3.74 years. The age distribution of both study groups was statistically same (p-value= 0.174).

McDonnel et al. found that BMI in their patients was 26±3 in cases and 28±6 in controls which was very close to our results. In our study, mean BMI in group A was observed as 28.74±3.56 and in group B was observed as 29.72±3.90[5].

In the same study, McDonnel et al. reported the postoperative VAS pain scores at rest and on movement to be lower, after TAP block, at many time points. They demonstrated, both at rest and movement, the TAP block group had statistically and significantly less pain as well as morphine consumption compared to the control group.[5]

Consistent with the study mentioned above, mean pain score using Visual Analogue Scale (VAS), in our study, at 24 hours was 2.82±0.83 in patients treated with Abdominal Plane Block and 5.01±1.03 in control group. The minimum and maximum pain scores in group A (administered through Abdominal Plane Block) were 1 and 5 and group B (control group) were 3 and 7 respectively. Moreover, the same was true when both groups were compared for age groups, parity and obesity versus mean pain score on VAS (p-value<0.001).

In another study, McDonnel evaluated the analgesic efficacy of TAP block in patients during the first 24 postoperative hours after abdominal surgery, in a randomized, controlled double-blind clinical trial and concluded that the TAP block provided highly effective postoperative analgesia in the first 24 postoperative hours after major abdominal surgery[10].

Carney and colleagues also conducted a study to evaluate the analgesic efficacy of the TAP block in patients undergoing total abdominal hysterectomy and reported that the TAP block with ropivacaine reduced postoperative visual analog scale pain scores compared to placebo block[8].

In current study, we analyzed that TAP block is a highly effective postoperative analgesia in first 24 hours postoperatively, after cesarean section. The TAP block has better efficacy for pain relief compared to placebo when stratified for age groups, parity and obesity. However, there were a few limitations to our study. Researchers and the healthcare providers evaluating the patients for pain were not blinded towards the study groups. In addition, we didn't evaluate the requirement of top-up analgesics.

CONCLUSION

TAP block provides better postop analgesia, in terms of VAS score, after caesarean section. However, further, controlled and blinded studies are suggested, to evaluate TAP block against other potent analgesics.

Declaration of conflict of interest: This study was conducted at a public-sector hospital and all the services, including the medicine and disposables, were provided to the patient free of cost. Therefore, the authors have no conflict of interest to declare.

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