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ORIGINAL ARTICLE

Comparison of Analgesic Outcomes of Bilateral Transversus Abdominis Plane Block with Intravenous Tramadol Following Cesarean Delivery Under Spinal Anesthesia

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ABSTRACT

Objective: To compare the effect of bilateral transversus abdominis plane (TAP) block analgesia and intravenous tramadol in post-operative period following cesarean delivery under spinal anesthesia.

Patients and Methods: In this randomized controlled trial we included 100 patients who underwent elective cesarean delivery from 1-June-2021 to 01-January-2022 in Nishtar Hospital Multan. All patients were given spinal anaesthesia using standard technique. In group A, patients were given TAP block at the end of the procedure. Group B, was given spinal anaesthesia alone with intravenous tramadol 50 mg and analgesia requirement were noticed at 12 hours postoperatively.

Results: Mean age was 28.28±4.61 years. Mean BMI was 23.60±2.33 kg/m^2. Mean gestational age of patients was 39.96±1.26 weeks. Mean duration of procedure was 48.10±5.39 minutes. Mean duration in TAP block was 48.53±5.30 minutes and in IV analgesia group was 47.67±5.50 minutes (p-value 0.42). Mean VAS for pain was 4.27±1.50. Mean VAS for pain in TAP block was 3.46±0.93 and in IV analgesia group was 5.07±1.56 with p-value of <0.001. The mean VAS score after 24 hours was 0.7±0.5 in TAP group versus 3.1±0.7 in IV analgesia only (p-value <0.0001). Time of first rescue analgesia was 212±60 minutes in TAP group versus 77±23 minutes in IV analgesia only group (p-value <0.001) [Table 1].

Conclusion: The use of the bilateral TAP block in patients undergoing elective cesarean delivery can reduce postoperative pain and analgesic usage for up to 24 hours after the procedure.

Key Words: Transversus abdominis plane (TAP), block analgesia, intravenous tramadol, cesarean delivery, spinal anesthesia.

INTRODUCTION

Cesarean delivery (CD) associated abdominal incision and muscle dissection causes pain and discomfort in post-period that hinders early mobilization and breastfeeding. Other postoperative problems, including as thromboembolic diseases, can result as a result of this immobility.[1] Therefore, it appears that offering an effective analgesic approach is a must during this period. Opioid analgesia is still the most effective pain reliever in a wide range of surgeries, although it might have side effects as pruritus, urine retention, nausea & vomiting, and respiratory depression.[2, 3] Because opioid analgesia and associated side effects are dose-dependent, a multimodal approach could improve analgesia while reducing side effects.[4]

Cesarean deliveries are becoming more common as a result of an increased emphasis on prenatal care and close monitoring of both the mother and the fetus' health. The mother's ability to return to a regular life and her function as a nurse is likely to be affected by postoperative discomfort and suffering.[5] In addition, immobility due to discomfort increases the risk of thromboembolism. Postoperative pain management relies heavily on the use of systemic or neuraxial opioids. Some of the negative effects include dizziness and diarrhoea as well as respiratory depression and nausea.[6]

Despite the multiple strategies devised to treat postoperative pain, inadequate analgesia following cesarean section is prevalent, accounting for approximately half of all cases.[7] The TAP block is a relatively new localized treatment. This strategy is straightforward and can be implemented in facilities with low resources by utilizing locally accessible equipment, medications, and human resources.[8] There are only a few studies examining the role of TAP block in women undergoing spinal anesthesia for cesarean delivery. So, we set out to test the efficacy of postoperative analgesic outcomes following cesarean section with and without TAP block.

METHODS

This was a prospective randomized controlled study including 100 patients who underwent CD from 1-June-2021 to 1-January-2022 in Nishtar Hospital Multan. Patients fulfilling the selection criteria were recruited consecutively into the study from operation theatres. After taking informed consent, demographic information like name, age, height, weight, BMI and contact were obtained.

All patients were randomly allocated to two groups; Group A is spinal anaesthesia with TAP block and group B is spinal anaesthesia without TAP block.

All patients were given spinal anaesthesia using standard technique. In group A, patients were given TAP block at the end of the procedure and analgesia requirement were noticed at 12hrs postoperatively. Group B, was given spinal anaesthesia alone with intravenous tramadol 50 mg.

Data was entered and analysis in to SPSS version -21 (IBM SPSS Chicago Inc LTd). Descriptive statistics were computed. To compare the mean significance difference of visual analog scale of TAP block and intravenous analgesia after cesarean delivery under spinal anaesthesia, appropriate independent sample t-test was applied. All analysis was done at 5% level of significance.

RESULTS

Mean age was 28.28±4.61 years. Mean age of patients in tap block was 28.38±4.39 years and in IV analgesia group was 28.46±4.87 years with p-value of 0.81 (Table 3).

Mean weight was 56.77±8.67 Kg. Mean height was 154.97±9.88 cm. Mean BMI was 23.60±2.33 kg/m^2. On frequency of BMI category, normal weight patients were 75 (75%) and overweight weight were 25 (25.0%).

Mean gestational age of patients was 39.96±1.26 weeks. Mean parity was 1.97±1.03. Previous cesarean section was found in 17 (17%) patients.

Mean duration of procedure was 48.10±5.39 minutes. Mean duration in TAP block was 48.53±5.30 minutes and in IV analgesia group was 47.67±5.50 minutes (p-value 0.42).

Mean VAS for pain was 4.27±1.50. Mean VAS for pain in TAP block was 3.46±0.93 and in IV analgesia group was 5.07±1.56 with p-value of <0.001. The mean VAS score after 24 hours was 0.7±0.5 in TAP group versus 3.1±0.7 in IV analgesia

only (p-value <0.0001). Time of first rescue analgesia was 212±60 minutes in TAP group versus 77±23 minutes in IV analgesia only group (p-value <0.001) [Table 1].

Table 1. Comparison of Study Outcomes.

	TAP Block (N = 51)	IV Analgesia (N = 51)	P-value
VAS			
12 hours	3.45±0.92	5.08±1.55	<0.001
24 Hours	0.7±0.5	3.1±0.7	<0.001
Time of First Rescue Analgesia	212±60	77±23	<0.001

DISCUSSION

TAP block, delayed the time for rescue analgesia, reduced the need for opioid analgesic, and decreased VAS, according to our findings. Multimodal analgesia is a well-known method for managing post-operative pain. By mixing multiple medications with varying durations, multimodal analgesia produces superior results, and it also decreases the negative effects of individual treatments.[9] Rafi introduced the TAP block in 2001.[10] Later on Hebbard et al. presented the USG-guided TAP block technique in 2007.[11] In our research, we used US guided approach.

TAP block has been utilized for cholecystectomy, large bowel resection, appendectomy, inguinal hernia, abdominal hysterectomy, open prostatectomy, and iliac crest bone graft, among other abdominal surgeries other than caesarean section.[12] Because the TAP has weak vascularity, its action lasts a long time and is free of severe problems.[13] To avoid complications that are more likely with the blind approach, we adopted the USG-guided procedure. Furthermore, it provides a real-time image, lowering the risk of failure.

When compared to the placebo group, a research using USG-guided TAP block with 0.5 percent ropivacaine following caesarean delivery reported a reduction in total morphine consumption in 24 hours in the TAP group; 18 mg versus median 31.5 mg in placebo. The TAP group's VASs were likewise lower than the placebo group's; 96 mm vs. 77 mm, with P = 0.008).[14]

McDonnell et al. in a study including 50 patients of cesarean section determine the analgesic outcomes of TAP block and reported a significant reduction in total analgesia requirements in TAP group.[15]

Eslamian et al. in another study on the role of TAP block for post-op analgesia, reported significantly lower VAS score in patients receiving TAP block in comparison to control patients. The time of rescue analgesia was also prolonged in TAP group; 210 minutes vs 30 minutes in control group.[16]

TAP block was studied in ASA I and II patients undergoing elective caesarean delivery under spinal anaesthesia with 20 ml of 0.25 percent bupivacaine or levobupivacaine in two separate investigations. When compared to control (no medication) groups, pain levels were lower and time to demand initial analgesia was significantly longer in study groups.[17]

Another study, which included ASA II patients undergoing caesarean section under spinal anesthesia and used 20 ml of 0.375 percent ropivacaine on either side, found a reduction in mean VAS score (P 0.001) and reduced opioid demand.[18]

In the context of multimodal analgesia for caesarean delivery that excludes intrathecal morphine, systematic reviews and meta-analyses also found that TAP block generates superior analgesia and lowers supplemental opioid usage when compared to placebo. However, when intrathecal morphine was given, it proved difficult to establish these benefits. When intrathecal morphine is contraindicated or creates unpleasant side effects, they concluded that TAP block should be investigated as an alternative.[19, 20]

The analgesic efficacy of the TAP block has been demonstrated in randomized controlled trials, however these studies lack the power to detect the block's infrequent side effects. As a result of these studies, it is not necessary to have a large sample size trials to demonstrate the link between treatment and effect. As a result, more extensive studies on safety are needed. The safe dose and concentration of local anaesthetic solution must also be established to minimize systemic toxic consequences of the block while maintaining its analgesic efficacy.

CONCLUSION

The use of the bilateral TAP block in patients undergoing elective cesarean delivery can reduce postoperative pain and analgesic usage for up to 24 hours after the procedure.

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