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## Comparative Study between Transversus Abdominus Plain block, local Subcutaneous Injection in Wound and Intravenous Nalbuphine in Decreasing Post-Operative Pain in Cesarean Section

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### ABSTRACT

**Background:** Cesarean delivery is the birth of a baby via surgical incisions in the abdominal wall (laparotomy) and the uterine wall (hysterotomy).

**Aim of the work:** To compare between the analgesic effects of different ways to relieve post cesarean section pain in terms of pain relief, duration of pain relief and need of adding other analgesics and number of these analgesics.

**Patients and methods:** Patients who were scheduled for elective CS were informed about the experiment at their preoperative anesthesia assessment. Patients having a history of drug addiction or a significant drug allergy were not included from the investigation. All patients with medical problems as diabetes or pre-eclampsia and all emergency cesarean section was excluded. They were registered on the day of surgery after receiving signed informed permission.

**Results:** There was no substantial variation in post-operative Systolic or diastolic blood pressure among the three groups or between each group and the other one (P > 0.05).

**Conclusion:** There is no variance between tap block local wound injection in decreasing post cesarean pain and number of ketorolac amp used to decrease post-surgical pain while both are significantly better than IV nalbuphin in decreasing post-surgical pain and number of ketorolac ampoules used.

**Keywords:** Cesarean delivery; laparotomy; anaesthetic.

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**Authorship:** All authors have a substantial contribution to the article.

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### INTRODUCTION

Cesarean delivery occurs when a fetus is delivered via surgical incisions in the abdominal wall (laparotomy) and the uterine wall (hysterotomy).<sup>1</sup>

Egypt has the world's third-highest rate (54%) of caesarean sections, after Dominican and Turkey and almost the same as Brazil while Brazil is taking powerful steps to reduce CS rate, Egypt lacks a consistent categorization system for analyzing caesarean section rates.<sup>2</sup>

There has been several researches looking at the impact of diclofenac on post-operative pain treatment, since they are the cornerstone of post-CS analgesics, although there are changes in the method or dosage of administering, as well as combinations

of analgesics. rectal diclofenac Prescription, compared to placebo, reduced post-operative pain and opiate intake in three trials with limited sample numbers.<sup>3</sup>

By blocking the T6–L1 segmental nerves as they lie within the fascial plane between the transversus abdominis and internal oblique muscles, a transversus abdominis plane (TAP) block provides analgesia of the anterior and lateral abdominal wall below the umbilicus: bilateral block for midline abdominal incision. Rafi initially defined it in 2001 as a classic blind landmark approach based on Petit's lumbar triangle. After that, a local anesthetic is administered between the internal oblique and transverse abdominis muscles, right below the fascial

plane, which is where the sensory nerves travel through.<sup>4</sup>

The Aim of this research was to examine the analgesic effects of different ways to relieve post cesarean section pain in terms of pain relief, duration of pain relief and need of adding other analgesics and number of these analgesics.

### PATIENTS AND METHODS

Patients who were scheduled for elective CS were informed about the experiment at their preoperative anesthesia assessment. Patients having a history of drug addiction or a significant drug allergy were excluded from the study. All individuals with diabetes or pre-eclampsia, as well as all emergency caesarean sections were excluded. They were registered on the day of surgery after receiving signed informed permission.

A Multicentric study will be done in several hospitals as: Sayed Galal hospital, AlHussein Hospital, Al-Zahraa hospitals and Om-Elmasryeen Hospital Department of Obstetrics and Gynecology for patients undergoing cesarean section from March 2022 till April 2022.

Institutional Ethics Committee will approve the study.

Cases will be divided into four groups (100 each): Control group will be given nothing and only non-steroidal anti-inflammatory drugs on need. Nalufin group will be given IV nalufin. Local anesthetic group will be given a S.C injection of local anesthetic in the wound. Total abdominal plain block group will be given a TAP block.

In all groups nonsteroidal anti-inflammatory medicines will be given as a rescue analgesic and the total dose will be calculated and compared.

The pain level of the cases is evaluated by means of the digital pain (numeric rating) scale from 0 to 10 in which 0 representing "no pain" and 10 representing "the worst pain" as well as the duration of pain relief and the need for another dose of the same analgesic or other. The pain level is evaluated again if it is present.

Patients are evaluated before surgery with detailed history, full clinical examination, and routine laboratory tests.

All patients will take the same type and protocol of anesthesia.

Inclusion criteria: Pregnant women aged 20-35 years, Gestational age between 37-40 weeks, pregnant women undergoing elective cesarean section, medically free and singleton pregnancy.

Exclusion criteria: Emergency cesarean section, diabetic, hypertensive, severe anemia, multiple pregnancy and complication during section

All patients will be subject to the following: Written approval will be taken from them to agree to participate in the study, take the full medical history, general examination, take same NSAIDs, evaluating the pain level on the digital level and evaluating the duration of pain relief and the need for other doses of the same analgesic or other.

Anesthesia was standardized in all patients. All patients were operated under spinal anesthesia, patients administrated intrathecal injection of 2 ml of 0.5% hyperbaric (heavy) bupivacaine plus 0.5 ml fentanyl (25 µg), at L3/4 level.

Following surgery:

Transversus abdominis plane (TAP) block: The lateral TAP block: from the lower costal border and the iliac crest in the TAP to the lateral abdominal wall in the midaxillary line. The posterior TAP block: at the TAP, in the region of Petit's triangle The lack of cold feeling in the distribution of T7-L1 dermatomes on the side of the block demonstrated the successful block. Failure to perceive the Petit triangle, particularly in obese individuals, as well as "pop" feelings. This block is volume dependent since it depends on local anesthetic dissemination rather than concentration.). ADDED: for 50 kg 25 mL and for 60 to 80 kg 30 mL

Wound infiltration: At surgical incision sites, local anesthetic is injected into the skin and subcutaneous tissue layer. The patients were given 40 mL of 0.25% bupivacaine, 30 mL of 0.25 percent bupivacaine, 20 mL of 0.25% bupivacaine, 0.3 ml/kg of 0.2 % bupivacaine, 0.7 mg/kg of 0.25 % bupivacaine (diluted to 20 mL with normal saline), half of the volume was injected at the upper edge and the other half at the.

Nalbuphine: Nalbuphine 0.25 mg/kg, nalbuphine 0.2 mg/kg, nalbuphine 15– 20 mg was given intravenously (nalufin 20 mg in 1 ml ampoule, Amoun Pharmaceutical Co., Cairo, Egypt).

Analgesia assessment (Pain assessment): Numeric rating scale (NRS) for pain use numbers to rate pain. The patient is asked to rate her pain intensity as a number. Pain intensity according to the NRS was assessed at 2, 4, 6, 8, 10, 12, and 24-hour postsurgery in all groups, and at every analgesic request by the patient. Skin suturing at the end of surgery, was chosen as point 0 in time.

Ketorolac (ketolac): ketolac 30mg IV was given for analgesia to all patients in all groups scoring  $\geq 4$  until the NRS was  $\leq 3$ . Total amount of ketolac consumption was recorded. The postoperative patient satisfaction were also measured Patient satisfaction with analgesia will be graded on a scale of 1 to 4 (poor = 1, fair = 2, good = 3, excellent = 4).

Statistical analysis: The data was coded, entered, and evaluated utilizing Microsoft Excel software throughout history, basic clinical examination, laboratory findings, and outcome measures. On an IBM compatible computer, the data was tabulated and evaluated utilizing SPSS (statistical program for social science) version 25 (Armonk, NY: IBM Corp). The Kolmogorov–Smirnov and Shapiro–Wilk tests were utilized to ensure that the data was normal. The Mann-Whitney U Test is a measure for analyzing two groups with non-normally distributed quantitative data. To evaluate and connect two qualitative variables, the Chi-square test ( $\chi^2$ ) was used.

**RESULTS**

Patients' characteristics (age, parity and gravity) were insignificantly different among the three groups (P = 0.437, 0.571 and 0.523 respectively). Table 1

There was no discernible change in post-operative Systolic or diastolic blood pressure among the three groups or between each group and the other one (P > 0.05). Table 2

There was no substantial difference in bleeding during operation among the three groups or between each group and the other one (P > 0.05). Table 3

NRS at 4h, 12h and 24h was increased in LA group than TAB group and Nalufin group (P1 = 0.017, <0.001 and <0.001 respectively, P2 <0.001) and was substantially decreased in TAB group than Nalufin group (P3 <0.001, 0.035 and 0.003 respectively). Figure 2

Number of ketorolac amp to decrease score was significantly different among the three group at 2h, 4h, 6h, 12h and 24h (P <0.001) and was insignificantly different among the three groups at 10h and 12h. Figure 2

Total ketorolac consumption in the 1st 24 hours was different among the three groups (P = 0.099). Table 4

		LA group (n = 100)	TAB group (n = 100)	Nalufin group (n = 100)	P value
Age (Years)	Mean ± SD	26.35 ± 5.65	25.28 ± 6.25	25.91 ± 5.79	0.437
	Range	17-40	17-40	18-40	
Parity	Median	1	1	1	0.571
	IQR	1-2	0-2	0.75-2	
Gravity	Median	3	2	2	0.523
	IQR	2-3	1-3	2-3	

**Table 3:** Patients' characteristics among the three groups

	LA group (n = 100)		TAB group (n = 100)		Nalufin group (n = 100)		P value	P1	P2	P3
	Median	± SD	Median	± SD	Mean	± SD				
Systolic Blood Pressure	115.3	8.6	117.4	8.5	115.45	9.12	>0.05	>0.05	>0.05	>0.05
Diastolic Blood Pressure	72.45	7.4	72.33	7.09	72.7	7.8	>0.05	>0.05	>0.05	>0.05

**Table 2:** Post-operative Blood pressure

P value > 0.05 no significant difference. P1: P value between LA and TAB groups, P2: P value between LA and Nalufin groups, P3: P value between TAB and Nalufin groups.

	LA group (n = 100)		TAB group (n = 100)		Nalufin group (n = 100)		P value	P1	P2	P3
	Mean	± SD	Median	± SD	Median	± SD				
	131.87	42.5	121.3	42.7	125.2	44.7	>0.05	>0.05	>0.05	>0.05

**Table 3:** Bleeding during operation

P value > 0.05 no significant difference. P1: P value between LA and TAB groups, P2: P value between LA and Nalufin groups, P3: P value between TAB and Nalufin groups.

	LA group (n = 100)	TAB group (n = 100)	Nalufin group (n = 100)	P value	
Total ketorolac consumption	Mean ± SD	3.72 ± 0.92	3.82 ± 1.0	6 ± 0.86	0.099
in 1st 24 hours	Range	2-6	2-6	4-6	

**Table 4:** Total ketorolac consumption in the 1st 24 hours among the three groups

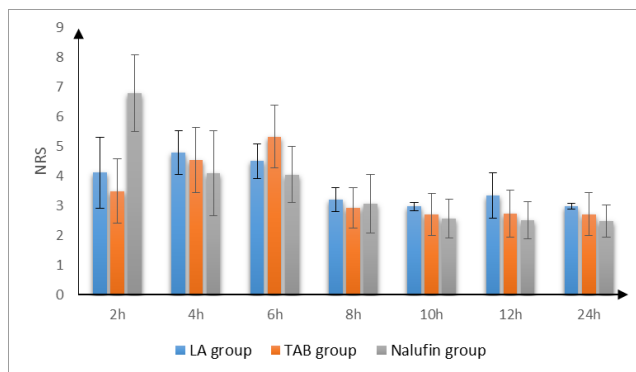


Fig. 1: NRS of the three groups

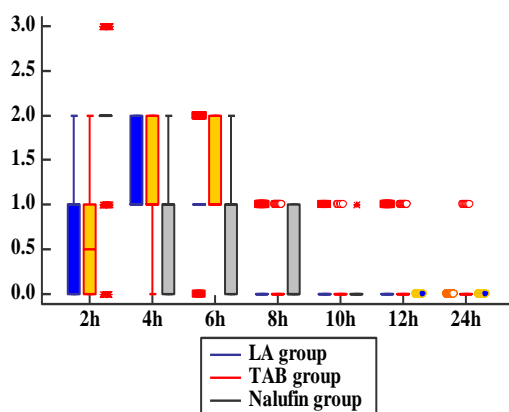


Fig. 2: Number of ketorolac amp to decrease score of the three groups

**DISCUSSION**

The goal of this research is to evaluate the TAP block, wound injection, and intravenous nalbuphine approaches for minimizing postoperative pain caused by CS. In conclusion, the study found no benefit in choosing TAP block to wound infiltration of local anesthetics for pain management after Cesarean Section, with no substantial variance between the two and IV nalbuphine, and a comparable degree of patient satisfaction among the TAP block and local wound injection techniques. In terms of safety and tolerability, the pooled RRs revealed no statistically substantial variations in removal and adverse effect rates.

Wound infiltration with a local anesthetic drug is becoming commonplace. It has undergone extensive testing and validation after a variety of surgical procedures. Gupta et al.<sup>5</sup> conducted a meta-analysis that found the approach to be successful, particularly in gynecological and obstetric surgery sufferers. In other surgical operations, wound catheters did not provide substantial ranks of analgesia at relaxation or during exercise. Another meta-analysis by Bamigboye et al.<sup>6</sup> verified the efficiency of wound infiltrations following CS. Furthermore, when the catheter tip is inserted below the fascia, the effectiveness of a wound infiltration

approach with a local anesthetic/non-steroidal anti-inflammatory medication combination is much greater.

In actuality, the TAP block is becoming more common as a postoperative analgesic. There is currently no agreement on the best method. The TAP block was classified by Hebbard et al.<sup>7</sup> into five groups: upper subcostal, lower subcostal, lateral, ilioinguinal, and posterior. Nowadays, it is recommended that the local anesthetic injection be made between the transversus abdominis muscle and the fascia zone, which is deep inside the internal oblique muscle, rather than in the fascial layer itself, as was the case in each of the studies in this review.

Few studies that compared effect of tap block vs. local wound infiltration concluded that TAP block and wound injection or infiltration with local anesthetic have almost no difference in patient satisfaction and post cesarean pain while there is much difference between them and IV nalbuphine

**Limitations**

When analyzing the findings and building the framework for future research on this issue, it's important to keep in mind the study's limitations. Our small sample size may restrict the generalizability of our findings, future studies with large scale sample size should be in consideration, future studies should

compare between combination between Transversus Abdominus Plain block, local subcutaneous injection in wound and intravenous Nalbuphine. The current study revealed that there is No significant difference between tap block local wound injection in decreasing post cesarean pain and number of ketorolac amp used to decrease post-surgical pain while both are significantly better than IV nalbuphin in decreasing post-surgical pain and number of ketorolac ampoules used. Nonetheless, because of the methodological consistency, any variations between the samples were preserved, preserving within-study validity.

### CONCLUSION

There is no variation between tap block local wound injection in decreasing post cesarean pain and number of ketorolac amp used to decrease post-surgical pain while both are significantly better than IV Nalbuphin in decreasing post-surgical pain and number of ketorolac ampoules used.

Conflict of interest : none

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