

Comparison Study Between TAP Block and Morphine Bolus in Decreasing Systemic Analgesia in Postoperative Cesarean Section

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ABSTRACT

Background: Ultrasound guided TAP block is a new technique providing analgesia for lower abdominal surgeries, safe & effective as multimodal analgesia.

Aim of the study: To compare between the TAP block & morphine in approving effectiveness in decrease the need for systemic analgesia in post-operative cesarean section under general anesthesia.

Patient and method: This study is randomized prospective study was conducted at Baghdad teaching hospital and nursing house hospital ,medical city , Baghdad , Iraq. From the date 1st of February 2016 until 1st of September 2016. Eighty patients with elective cesarean section was selected, all of them ASAII, their ages from 20-45 years and their weight from 60-100Kg. The patients were divided randomly in to 2 groups: 1st group (TAP group).40 patients 2nd group (morphine group). 40 patients Both groups conducted with the same anesthetic protocol.

Result: Ultrasound guided TAP block will decrease the need for systemic analgesic requirement compare with the opioid (morphine)bolus in postoperative cesarean section under general anesthesia.

Conclusion: Ultrasound guided TAP block is better in decrease the need for systemic analgesic requirement compare with the opioid (morphine).

KEYWORDS: TAP block , morphine , multimodal analgesia.

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INTRODUCTION

Both general and regional anesthesia (spinal, epidural or combined spinal and epidural anesthesia) are acceptable for use during Caesarean section.

Regional anesthesia is preferred as it allows the mother to be awake and interact immediately with her baby.¹

The transverse abdominis plane (TAP) block is a peripheral nerve block designed to anesthetize the nerves supplying the anterior abdominal wall (T6 to L1). It was first described in 2001 by Rafi as a traditional blind landmark technique using the lumbar triangle of Petit.²

TAP block is considered as regional technique that blocks stimulation from anterolateral abdominal wall .the posterior approach mainly block T10-L1that supply the lower abdominal wall so, it is very useful in the lower abdominal surgeries bellow the umbilicus, so it can used as multimodal analgesia.

The TAP block is a simple procedure that can be used as an adjunct for postoperative pain control in obstetric patients.³

PATIENTS AND METHODS

This study is randomized prospective study was conducted at Baghdad teaching hospital and nursing house hospital, medical city, Baghdad ,Iraq .From the date 1st of February 2016 until 1st

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of September 2016.

Eighty patients with elective cesarean section was selected, all of them ASA II, their ages from 20-45 years and their weight from 60-100kg.

Approval were obtained from Arabic committee for medical specialization & scientific counsel for anesthesia & intensive care Arabic board as well as written informed consent from all the patients.

In this study, eighty patients was candidate to elective cesarean section ,divided in to 2 groups:

- 1st group (TAP group).
- 2nd group (Morphine group).

The 1st group received TAP block under ultrasound guide in the recovery room while the 2nd group received opioid (morphine) in the recovery room according to pain score of the patients (numerical rating scale) to abolish the post-operative pain.

Any elective cesarean section that weight between 60-100kg were included.

Exclusion criteria

- Patients already has another source of pain.
- Patients already on pain killer.
- Patients refusal.
- ASA >2.

Both received the same anesthetic protocol .all the patients prepared properly to the operation, wide bore IV cannula inserted, received 500ml 0.9% normal saline, lying in supine position with the left lateral tilt of the table, preoxygenation done with 100%O₂ for 2-3 minutes.

80 patients were meet the criteria and included in the study, they were divided randomly in to 2 groups each with 40 patients.

Monitoring of the vital sign NIBP,SPO₂,PULSE RATE.

Premedication given to all the patients: Metaclopromide 10mg ,dexamethasone ampule 8mg, ranitidine ampule 50mg.

Anesthesia was induced by rapid sequence induction with propofol 1.5-2.5mg/Kg sleeping dose & ketamine 0.5 mg/kg and rocuronium 0.6mg/Kg followed by, intubation with endotracheal

tube size 7-7.5mm size.

Maintenance of anesthesia was done sevoflurane 2-2.5% and muscle relaxant (rocuronium).

After delivery of the baby, the patient received analgesia (fentanyl 50 microgram IV , diclofenac ampule 75mg IM).

After the end of the surgery, reversal given (neostigmin 2.5mg & atropine 1.2mg), & recovered smoothly.

In the recovery room , the patients were divided randomly in to 2 groups, 1st group received TAP block under ultrasound guided (ezono3000) , high frequency linear array probe (5.7-13.3 MHz)

45mm width.

TAP block done bilateral on each side under aseptic technique, after sterilization of the area , linear probe applied on the posterior abdominal wall called (petit triangle or lumbar triangle) above the iliac crest ,bounded above and medially with tendon of latissimus dorsi & anterior edge of external oblique muscle bellow with the iliac crest ,the bottom is the internal oblique & transverses abdominal muscle)along with the mid axillary line.

The 2nd group received morphine IV 1ml contain 10mg diluted by normal saline to 10ml & received IV, according to patients pain score (numerical rating scale) as some patients need 2 or 3mg ,others need 10 mg according to their pain threshold.

For both groups, systemic analgesia (rescue analgesia) is given to the patients when the pain score(numerical rating scale) more than 4 in the form of tramadol 1.7mg/kg and/or paracetamol vial 15mg/kg when NRS still more than 4 after received tramadol ampul.

Heart rate ,mean arterial blood pressure (MAP),pain severity was assed using numerical rating scale (NRS),in both groups at (0,2,4,6)hour postoperatively.

Anderson darling test was done to asses if continuous variables follow normal distribution, if follow normal distribution than mean and standard deviation used, if did not follow normal distribution than median and interquartile range (25% to 75% percentile range) will be used to present the data (boxplot and whisker used to present them graphically).

Discrete variables presented using there number and percentage used to present the data, chi square test used to analyze the discrete variable or Fisher exact test used to analyze the distribution between 2 groups (used instead of chi square for 2x2 table, if total sample <20 and if 2 or more with expected frequency less than 5).Two samples t test used to analyze the differences in means between two groups (if both follow normal distribution with no significant outlier), while one way ANOVA used to analyzed the differences between more than two groups (if they follow normal distribution with no significant outlier). Mann Whitney U test used to analyze the differences in median of two groups (if they do not follow normal distribution), while for more than two groups Kruskal Wallis test was performed, if the same group over 3 consecutive time periods Friedman ANOVA used then SPSS 20.0.0, Minitab 17.1.0 software package used to make the statistical analysis, p value considered when appropriate to be significant if less than 0.05.

RESULTS

The study included 80 patients divided into 2 groups, 40 patients received morphine and 40 patients received TAP B as analgesia, mean age of the patients was 28.3 ± 5.6 , their mean weight was 80.6 ± 8.1 , there was no significant differences between both groups in their age and weight as illustrated in table 1.

Table 1: demographic data				
	Morphine	TAP B	All	P value
Number	40	40	80	-
Age (years)	28.8 ± 5.5	27.9 ± 5.7	28.3 ± 5.6	0.451
Weight	79.7 ± 7.1	81.5 ± 8.9	80.6 ± 8.1	0.328

We considered pain score & MAP (systole & diastole) & pulse rate because in the pain there was increase in the sympathetic discharge & increase in BP & pulse rate.

Morphine group show significant increase in pain score (overall, and at each 2 hours interval also) in which median pain

score increased from 2 to 5 to 8 at hours, TAP B group show significant reduction in pain score especially from 2 hr. to 4 hours, while from 4 hr. to 6 hr. there was non-significant reduction in pain score, as illustrated in table 2 and figure 1.

Table 2: median change in pain score through the study			
Therapy	Pain score		
	2 hr	4 hr	6 hr
Morphine	2 (1 – 3)	5 (5 – 6)	8 (7 – 9)
TAP B	5 (4 – 5)	4 (3 – 4)	2 (1 – 6)
P value	<0.001	<0.001	<0.001
Data presented using : Median (25% - 75%)			

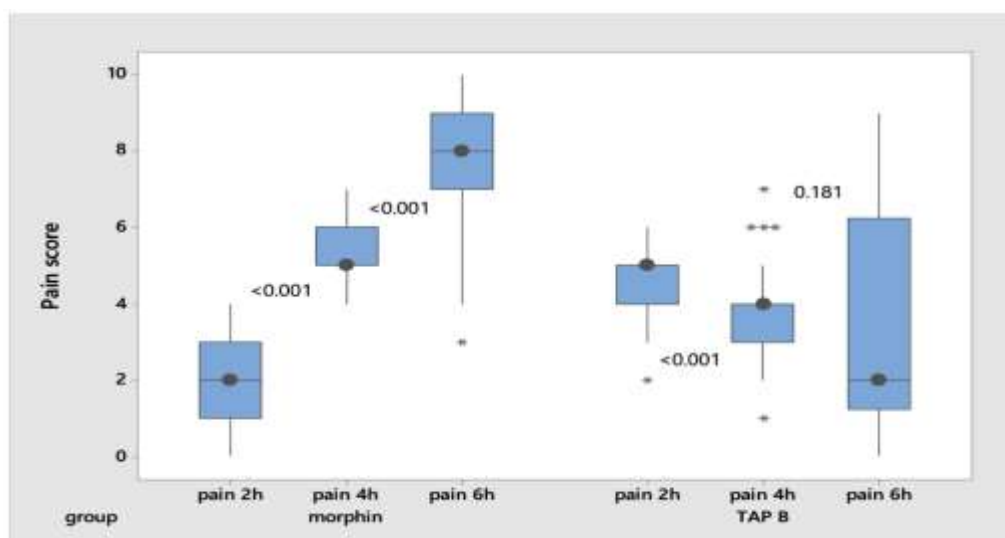


Figure 1: boxplot of pain score for each therapy (individual p value for each pain).

Morphine patients show significant increase though the study (and was significant), while TAP B did not show significant change in SBP as illustrated in table 3 and figure 2.

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Table 3: comparison of SBP			
	2 hours	4 hours	6 hours
Morphine	122 ± 9	128 ± 9	129 ± 9
TAP B	127 ± 10	126 ± 10	126 ± 11
P value	0.035	0.515	0.169

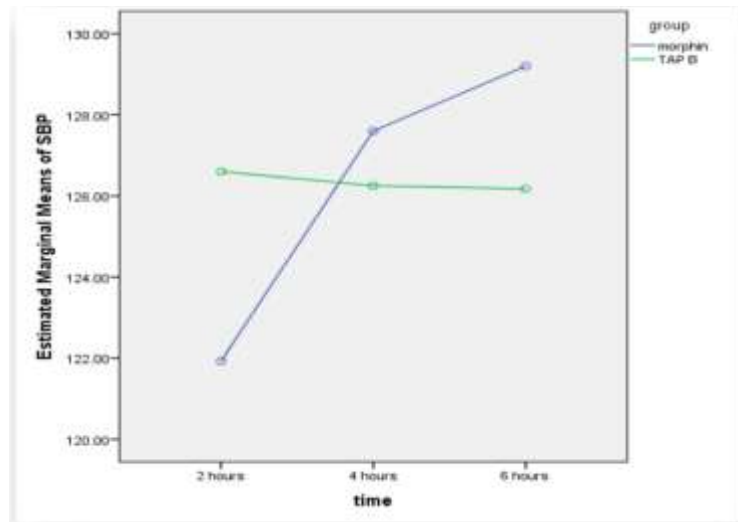


Figure 2: SBP of the two groups.

Morphine show significant increase in DBP compared to TAP B (through the study) as illustrated in table 4 and figure 3.

Table 4: comparison of DBP			
	2 hours	4 hours	6 hours
Morphine	77 ± 8	81 ± 7	81 ± 7
TAP B	79 ± 9	79 ± 9	81 ± 9
P value	0.237	0.475	0.782

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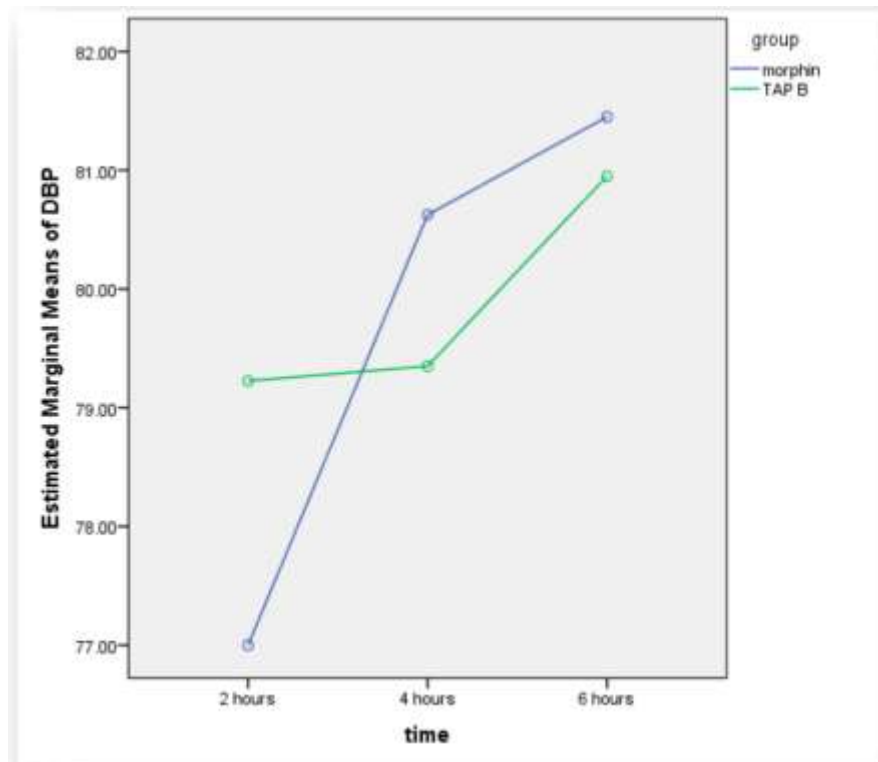


Figure 3: compared of DBP though the study.

Morphine show significantly higher pulse rate increase compared to TAP B as illustrated in table 6 and figure 4.

Table 5: comparison of pulse rate			
	2 hours	4 hours	6 hours
Morphine	80 ± 7	83 ± 7	84 ± 6
TAP B	83 ± 7	82 ± 7	83 ± 6
P value	0.034	0.358	0.445

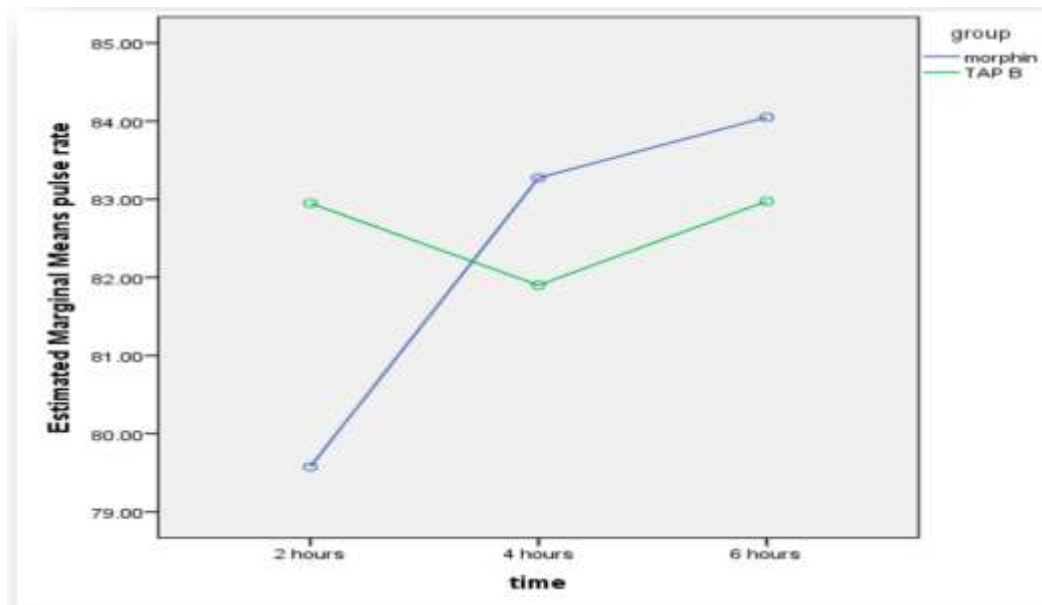


Figure 4: pulse rate change though the study.

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Table6 : comparison of MABP				
	0 hours	2 hours	4 hours	6 hours
Morphine	97.6 ± 4.5	92.0 ± 7.0	96.3 ± 6.6	97.4 ± 6.4
TAP B	98.7 ± 5.0	95.0 ± 8.7	95.0 ± 8.4	96.0 ± 9.2
P value	0.299	0.088	0.446	0.450

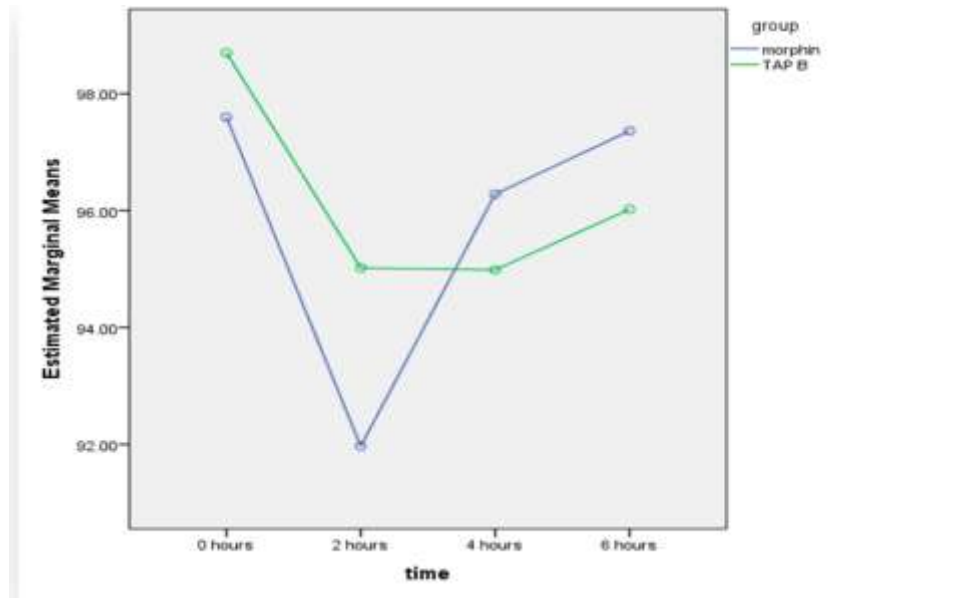


Figure 5: MAP change through the study.

In both groups when NRS of the patients more than 4 post operatively at (2,4,6 hr.) will receive rescue dose of analgesia (tramadol 1.7 mg/kg & dose of paracetamol 15mg/kg when NRS still more than 4 after received tramadol ampul).

In morphine group at the 1st 2 hr. postoperatively, no patient need for rescue dose of analgesia & after 4hr. 15 patients need T & 2 from these patients need P, at 6hr. 22 patients need T and all of

Them need P. In TAP B group at 1st 2hr. postoperatively, 17 patients need T and 15 patients from those need P & at 4hr. 11 patients need T & no one from those need P, at 6 hr. no patients need for rescue dose of systemic analgesia. as illustrated in table 7& figure 6.

Table7 :rescue dose of systemic analgesia(tramadol¶cetamol)				
		TAP B	Morphine	P value
2 hours	Need additional	17 (100%)	0 (0%)	<0.001
	Not need	23 (36.5%)	40 (63.5%)	
4 hours	Need additional	11 (42.3%)	15 (57.7%)	0.47
	Not need	29 (53.7%)	25 (46.3%)	
6 hours	Need additional	0 (0%)	22 (100%)	<0.001
	Not need	40 (69%)	18 (31%)	

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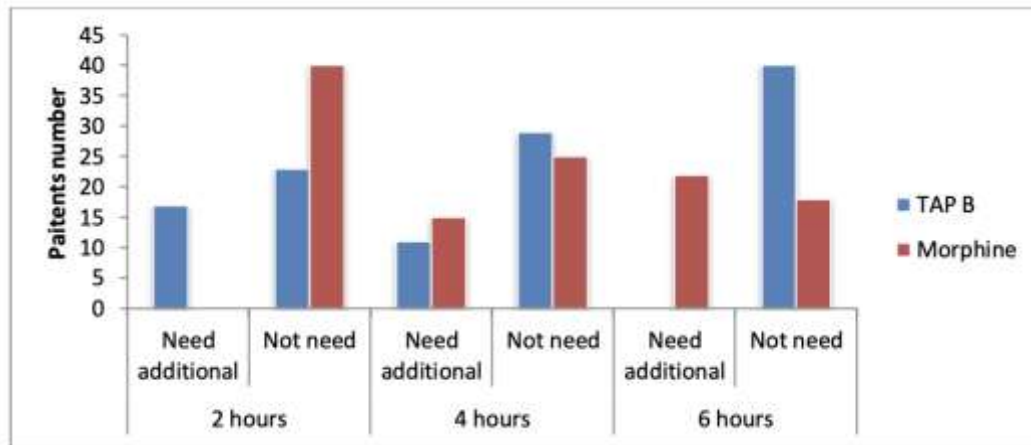


Figure 6: the need for additional doses of systemic analgesic requirement through the study.

DISCUSSION

In our study ,we'll divided the patients in to 2groups:

1st group (TAP group):40 patients 2nd group (morphine group): 40 patients In 1st group when applied TAP block (lumber triangle of petit) after cesarean section , the duration of pain free period prolong 6-10 hours after single injection. So, it will decrease the need for more systemic analgesic requirement. While in morphine group the duration of analgesic effect prolong 2-3hours,so it mean the need for more rescue dose of systemic analgesia after that time (tramadol ampule 1.7 mg/kg and/or paracetamol vial 1gm 15mg/kg).in compare with the 1st group.

In our study, there is no difference according to age & weight in both groups ,the pain depend on pain threshold for each person.

In morphine group show increase in pain score (numerical rating scale) from 2 to 5 to 8 in 2,4,6 hours(postoperatively) respectively. So, these group need more systemic analgesic requirement, While in TAP group show decrease in pain(numerical rating scale) from 7 to 4 to 2 in 2,4,6 hours(postoperatively) respectively .So also need for more systemic analgesic requirement only in the 1st 2 hours.

All the patients when their pain score (numerical rating scale) more than 4 ,giving them rescue dose of tramadol 1.7mg/kg and when it is not enough ,giving them dose of paracetamol vial 1gm 15 mg/kg.

According to pain score (numerical rating scale), in the 1st group28 from 40 patients need for tramadol IV & 15 from these 28patientsneed for paracetamol vial IV, while in the 2nd group 37 from 40 patients need for tramadol IV &24 from these 37 patients need for paracetamol vial IV.

Also in our study we compare MAP& pulse rate in both groups, in morphine group within the 1st 2hour ,there is sharp reduction in MAP from 98 to 92 mmHg ,while in the next 2 hour there is increase in MAP to 96 mmHg.in the final 2 hours, slightly increase in MAP to 97 mmHg.

In TAP group there was reduction in MAP within the 1st 2 hours from 99 to 95 mmHg while in the next 2 hour ,it remain 95 mmHg & the final 2 hour slightly increase to 96mmHg.

In morphine group there is fluctuation in the 1st 2 hours, while in TAP group ,MAP remain constant.

However ,small the difference despite being statistically significant ,remain clinically trivial.

In morphine group there is increase in pulse rate while monitoring the patients by pulse oximeter from 80, 83, 84 beat per minted in the 2,4,6 hour respectively.

While in TAP group there is little change in pulse rate from 83,82,83 beat per minute in 2,4,6 hour respectively.

So, more changes occur in pulse rate in increasing manner in morphine group while in TAP group the pulse rate remain constant almost. This research is 1st in using MAP & pulse rate in combination with the pain score and other research didn't focus on this point &there was good correlation between both vital sign & pain score.

Mc Donelle et al , use TAP block in 1st group(by anatomical landmark not ultrasound guided) as analgesia for postoperative cesarean section under spinal anesthesia, in this group local anesthesia used was ropivacaine 3mg/kg (maximum dose 150mg)while the other group use saline placebo, both groups received patient controlled analgesia (PCA) and rectal diclofenac & IV paracetamol.⁵

In 1st group there is significant reduction in VAS pain score with decrease requirement of morphine & other analgesia.

In our study, we use ultrasound guided TAP block and morphine bolus not patient controlled analgesia (PCA).

Belavy et al use ultrasound guided TAP block in the 1st group as analgesia for postoperative cesarean section under spinal anesthesia)while the other group use saline placebo as apart of multimodal analgesia regime (IV paracetamol ,NSAID'S) both groups received patient controlled analgesia (PCA) morphine this study show that 1st group decrease in morphine consumption 43%.⁶

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As our study shows the TAP block decrease in analgesic requirement & opioid consumption. While Costello et al used neuraxial opioid with spinal anesthesia in cesarean section (bupivacaine 12 mg + fentanyl 10Mg + morphine 100Mg).

The other group used ultrasound guided TAP block (20ml ropivacaine 0.375% on each side) as analgesia for postoperative cesarean section under spinal anesthesia. This study shows that intrathecal morphine very effective in decrease postoperative pain after cesarean section last longer than the TAP group because, TAP block provide analgesia only for somatic pain (act on the nerves that supply anterior abdominal wall (incisional site) while visceral pain from uterus was spared.⁷

Other study (Mc Morrow et al) that support this fact who also used spinal anesthesia in cesarean section in both groups , & add intrathecal morphine (100Mg) in the 1st group while the 2nd group only used ultrasound guided TAP block (20ml ropivacaine 0.375% on each side) as analgesia for postoperative cesarean section under spinal anesthesia⁸, show there is no benefit from TAP block in compare with intrathecal morphine.

Ain Shams university department of anesthesiologist , support our study , they use TAP block as a multimodal systemic analgesia for postoperative cesarean section under general anesthesia and given morphine bolus when pain score (VAS) more than 4 only .⁹

Their result as our result the 1st group need less systemic analgesia in compare to the 2nd one.

Other study Kadem & Field used ultrasound guided TAP block (continuous catheter) in post-operative abdominal surgery.¹⁰

Their result shows decrease in post-operative pain score & in fentanyl requirements.

CONCLUSION

Ultrasound guided TAP block for post-operative cesarean section decrease the need for more systemic analgesia (rescue doses) as compare with morphine IV bolus in post-operative period.

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