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Comparison Between Transversus Abdominis Plane Block and Intravenous Patient-Controlled Analgesia in pain control after cesarean section

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ABSTRACT

Background: The optimal analgesic regimen for major surgery should provide adequate pain relief, allow early mobilization, early return of gut function and feeding, and not cause complications. The cornerstone of analgesia remains multimodal analgesia combining regional analgesia or local anesthetic techniques and trying to avoid parenteral opioids and their side effects. Multiple prospective studies have demonstrated that minimizing opioids is associated with earlier return of bowel function and shorter length of hospital stay

Aim of the Study: The aim of the study is the selection of best method for analgesia transversus abdominis plane block or IV PCA to control postoperative pain after cesarean section.

Materials & Methods: This study was a randomized control trial which included 84 women having indication for cesarean delivery with pfannenstiel incision under spinal anesthesia who fulfilled the inclusion criteria in Obstetrics and Gynecology Department, Faculty of Medicine, Zagazig University in the period from march 2021 to September 2021.

Results: we found that both group Ⅰ and Ⅱ had statistically insignificant in VAS, additional analgesic need p>0.05.both group Ⅰ and Ⅱ had statistically insignificant in HR, RR, MAP and SPO2 p>0.05.There was significant difference in between two studied groups as regard nausea-vomiting in 1st hr. P<0.05, but no difference was observed after the 1st hour.There was no statistically significant difference among two studied groups regarding early mobilization and early bowel movement p>0.05, with early mobilization and early bowel movement more in group I than group II at 3rd hr.

Conclusion: The present study demonstrated that transversus abdominis plane block is effective as IVPCA in pain control after cesarean section.

Key words: Abdominis Plane Block; cesarean; Intravenous Patient-Controlled Analgesia

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INTRODUCTION

Cesarean section is one of the most commonoperations usually through pfannenstiel incision (low – abd - incision).

Cesarean section is associated with intense pain in the immediate postoperative period. This pain has a major effect on patient's fulfilment and may negatively interfere with the postoperative recovery progress **[1].**

Postoperative pain treatment is frequently provided with systemicopioid use or neuraxial techniques in patients who undergo lower abdominal surgery **[2].** Side effects such as sedation associated with opioids, respiratory depression, itching and nausea-vomiting and possible complications of neuraxial techniques such as paraplegia or bleeding appear as the disadvantages of this method.

Patient-controlled techniques allow patients to self-administer small boluses of analgesic, providing better titration and improving responsiveness in analgesic requirement **[3].**

Elkassabany et al., [2]Showed that both patient-controlled epidural analgesia (PCEA) and patient-controlled intravenous analgesia (PCIA) provide effective postoperative analgesia and both have been widely used in the past few decades.

Some researchers have pointed out that PCEA revealed more advantages in postoperative analgesia and could relieve pain both at rest and on coughing more effectively than PCIA after abdominal operations **[4].**

In the setting of abdominal surgery, postoperative IV morphine PCIA continues to be frequently used, although it has been clearly identified as causal to the delay of postoperative recovery due to side-effects such as postoperative nausea and vomiting (PONV), prolongation of gastric ileus, sedation, and dizziness **[5].**

Transverses abdominis plane (TAP) block is an intraoperative and postoperative anesthesia technique **[6].**

The effect of TAP block on multimodal postoperative pain management in lower abdominal surgeries has been testified **[7].**

TAP block was first defined by Rafi in 2001 **[8].** In this technique, two facial nerve clicks are felt while passing through the external and internal oblique muscles benefiting from the 'triangle of Petit,' and local anesthesia is given at this area. In 2007, this technique was defined again with ultrasound (USG) guidance.

Ultrasound-guided TAP block is performed by monitoring the region between the internal oblique muscle and transverses abdominis muscle, called 'TAP', for blocking the frontal branches of T6-L1 nerves and administering local anesthetic agents **[9].**

2. PATIENT AND METHODS

2.1. Technical Design

This study was a randomized control trial which included 84 women having indication for cesarean delivery with pfannenstiel incision under spinal anesthesia who fulfilled the inclusion criteria in Obstetrics and Gynecology Department, Faculty of Medicine, Zagazig University in the period from March 2021 to september 2021.

A verbal and written consent was obtained from each participant before participation and the study was approved by the Hospital Ethics Committee of Zagazig University.

The Ethics Committee of the Institute approval the study and performed as per the ethical standards laid down in 1964 (Declaration of Helsinki and its later amendments).

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a)***Inclusion Criteria***

Women age (18 – 38) years old, Women having history of medical and obstetric uneventful, Women having indication for cesarean delivery with pfannenstiel incision under spinal anesthesia, and Women with gestational age >34 weeks.

b) Exclusion Criteria

Women with allergy to the local anesthesia agent, Women on medication for chronic pain, Women under 18 years old, Women having any contra-indication for opioids, Women having chronic disease or medical disorder, and Women who undergo cesarean section with midline incision.

c) Discontinuation and Withdrawal

Participants could withdraw their consent at any point throughout the study duration. Patients who withdraw from the study may not have their anonymized data used without their permission.

2.2. Operational Design

All patients were subjected to:

History:Personal history (age, duration of marriage), Present history (any current medical or surgical diseases and any current medication), Obstetric history (including parity, LMP, obstetric complication).

Clinical examination: General examination: assessment of vital data (pulse, Bp, RR, TEMP), Cardiac and chest auscultation to exclude contraindication for anesthesia, Abdominal examination: assessment of fundal level and previous scar if present.

Investigations:Routine preoperative investigations were done includingCBC, Random blood sugar, Liver function, Kidney function, PT, PTT, INR, Urine analysis, and ECG.

a) All patients underwent the following

A Gauge cannula were inserted on the back of the left hand of the patients who were taken to the operating room, and 4 mL kg^{-1} 0.9% infusion was initiated. The age, weight of patients was recorded, and then electrocardiogram, peripheral oxygen saturation (SpO_2) and non-invasive blood pressure monitoring, which are standard procedures in an operating room, were performed in both groups who underwent cesarean section with pfannenstisel incision under Spinal anesthesia.

The patients included in the study were randomized into two groups.

b) Randomization

Each of the study procedures was written on a paper. The paper was put in a sealed envelope and the first patient chose one of the two envelopes then every odd number patient received the procedure the first patient randomly chose and even number patients received the other procedure.

Group (A): 42 women undergoing transversus abdominis plane block.

Patients received ultrasound guided TAP blockwith18 ml 0.25% bupivacaine (45mg), 2 ml magnesium sulphate (200mg) and 2ml dexamethasone (8mg). TAP block was performed in accordance with the rules of asepsis and antisepsis. With ultrasound, the site of injection was confirmed by giving a test dose of 0.5–1 mL 0,9% NaCl into the internal oblique and transversus abdominis muscles, and (when swollen muscle fascia was observed) local anesthetic agents were injected into TAP.

Group (B): 42 women undergoing IVpatient-controlled analgesia (PCA).

Patients were administrated (4ml /hr) IV PCA.

IV protocol for 100 ml PCA (4ml /hr) for one day:

Narcotics: morphine (20 mg) or Nalbphine (20-30 mg).

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Nonsteroidal: ketorolac (2-3 amp)
Antiemetics: Zofran (4-8 mg).
Steroids: Dexamethasone (4mg).
Magnesium sulphate amp (1 gm).

c) Post-operative follow-up

Heart rate (HR), mean arterial pressure, respiratory rate and SpO2 were evaluated in the preinduction period and at the postoperative 1st, 2nd, 3rd, 6th, 12th and 24th hours.Visual analog scale: VAS is a validated, subjective measure for acute and chronic pain. Score were recorded by marking a handwritten mark on a 10-cm line that represents a continuum no pain and worst pain.
Mild pain (VAS 0 -4 cm), Moderate pain (VAS 4 - 7cm), and Sever pain (VAS 7-10 cm)
Additional analgesic need: additional analgesic need was followed the same protocol for both groups:
The patients in both groups were given diclofenac 1 mg/ kg intramuscularly when (VAS > 4 cm).when (VAS > 7 cm) patients were given morphine 0.1 mg/ kg intravenously.
The presence of nausea-vomiting: The nausea-vomiting scale ranging from 0 to 3 will be used to assess nausea and vomiting [10].
0: no nausea-vomiting,
1: mild nausea-vomiting; no requirement for treatment.
2: moderate nausea-vomiting; requirement for treatment.
3: severe nausea-vomiting; resistance to treatment).
Resuming of the activity, mobilization was evaluated at the postoperative 1st, 2nd, 3rd, 6th, 12th and 24th hours.
Resuming of early bowel movement and feeding were evaluated at the postoperative 1st, 2nd, 3rd, 6th, 12th and 24th hours.

3. RESULTS

Table (1): Basic socio-demographic and medical characteristics of the studied women

Variables	Studied groups		t / χ^2	p
	Transversus Abdominis Plane Block group	**Intravenous Patient-Controlled Analgesia group**		
Age per years • mean± SD • Range	27.04±4.02 19-34	28.74±3.93 22-35	1.949	0.055

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parity				
• G2P1+0	12(28.6)	18(42.8)	6.83	0.145
• g3p2+0	9(21.4)	10(23.8)		
• G4 P2+1	0	2(4.8)		
• G4 P3+0	2(4.8)	0		
• PG	19(45.2)	12(28.6)		

χ^2 Chi square test t test of sig P>0.05was in significant

Table1: shows mean age per year of Transversus Abdominis Plane Block group was 27.04 years and 28.74 years of Intravenous Patient-Controlled Analgesia group, the difference statistically insignificant p>0.05. Also, there was statistically insignificant difference of both groups regard parity p>0.05.

Table (2): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard heart rate at different point of time

	Studied groups		**t**	**p**
	Transversus Abdominis Plane Block group	**Intravenous Patient-Controlled Analgesia group**		
HR 0 hour	73-82 77.71±1.78	77-80 78.29±1.11	1.762	0.082
HR 1 hour	66-81 75.4±3.68	75-78 76.29±1.01	1.494	0.142
HR 2 hour	73-80 76.33±1.71	73-82 77.12±1.93	1.978	0.051
HR 3 hour	72-79 76.09±1.61	73-80 76.9±2.36	1.835	0.070
HR 6 hour	72-79 76.24±2.48	75-80 76.95±1.19	1.679	0.098
HR 12 hour	77-82 78.57±1.88	76-81 78.91±1.71	0.851	0.397
HR 24 hour	76-82 79.66±1.91	77-84 80.62±2.59	1.95	0.059

Data were expressed as mean± SD (range), t=t test P>0.05was in significant

There was statistically insignificant difference of both groups regard heart rate at different time of follow up p>0.05.

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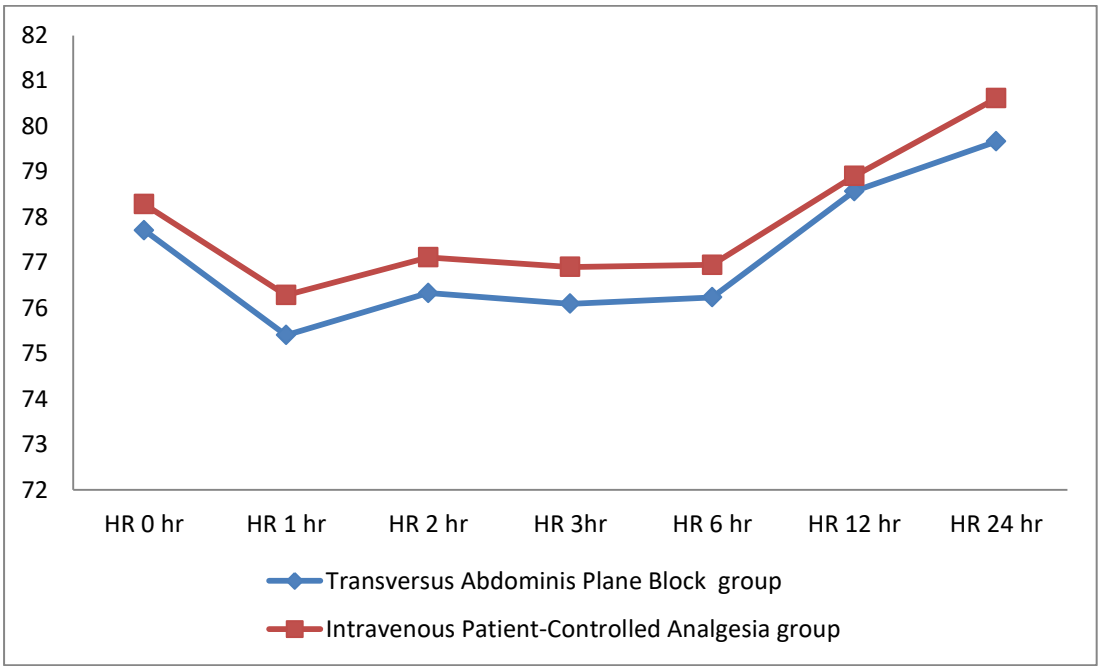

Figure (1): Mean of heart rate at different point of time of both groups.

Table (3): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard mean arterial pressure(MAP) at different point of time

	Studied groups		t	p
	Transversus Abdominis Plane Block group	**Intravenous Patient-Controlled Analgesia group**		
MAP 0 hr	89-90 89.81±0.39	89-91 90.02±0.71	1.69	0.095
MAP 1 hr	89-91 89.62±0.83	89-91 89.93±0.64	1.921	0.058
MAP 2 hr	90-91 90.95±0.22	89-93 91.36±1.34	1.932	0.060
MAP 3 hr	89-93 90.88±1.5	90-93 91.14±0.78	-1.002	0.320
MAP 6 hr	89-94 91.66±1.63	91-94 92.19±1.15	1.698	0.094
MAP 12 hr	92-93 92.19±0.39	90-93 92.17±1.19	0.123	0.902
MAP 24 hr	91-95 92.91±1.57	91-94 92.5±1.07	1.380	0.172

Data were expressed as mean± SD (range), t=t test P>0.05was in significant

There was statistically insignificant difference of both groups regard MAP at different time of follow up p>0.05.

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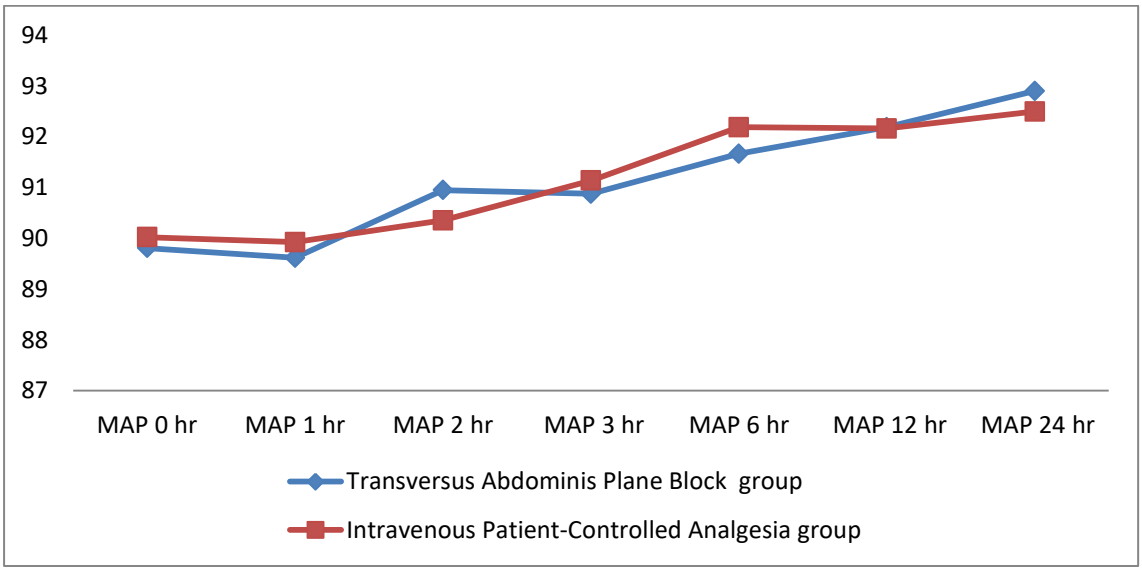

Figure (2): Mean of MAP at different point of time of both groups.

Table (4): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard respiratory rate at different point of time

	Studied groups		**t**	**p**
	Transversus Abdominis Plane Block group	Intravenous Patient-Controlled Analgesia group		
RR 0hour	13-16 14.57±0.94	14-16 14.62±0.76	0.255	0.8
RR 1hour	14-15 14.59±0.497	12-16 14.43±1.36	.744	0.460
RR 2 hour	14-16 15.21±0.68	13-17 14.86±1.39	1.49	0.139
RR 3 hour	13-16 14.45±1.06	13-17 14.76±1.01	1.36	0.17
RR 6 hour	14-16 15.05±0.88	14-17 15.38±1.1	1.53	0.13
RR 12 hour	16-18 16.79±0.75	15-18 16.59±1.06	.950	0.345
RR 24hour	15-17 15.91±0.76	14-18 16.02±1.39	0.488	0.627

Data were expressed as mean± SD (range), t=t test P>0.05was in significant

There was statistically insignificant difference of both groups regard respiratory rate at different time of follow up p>0.05.

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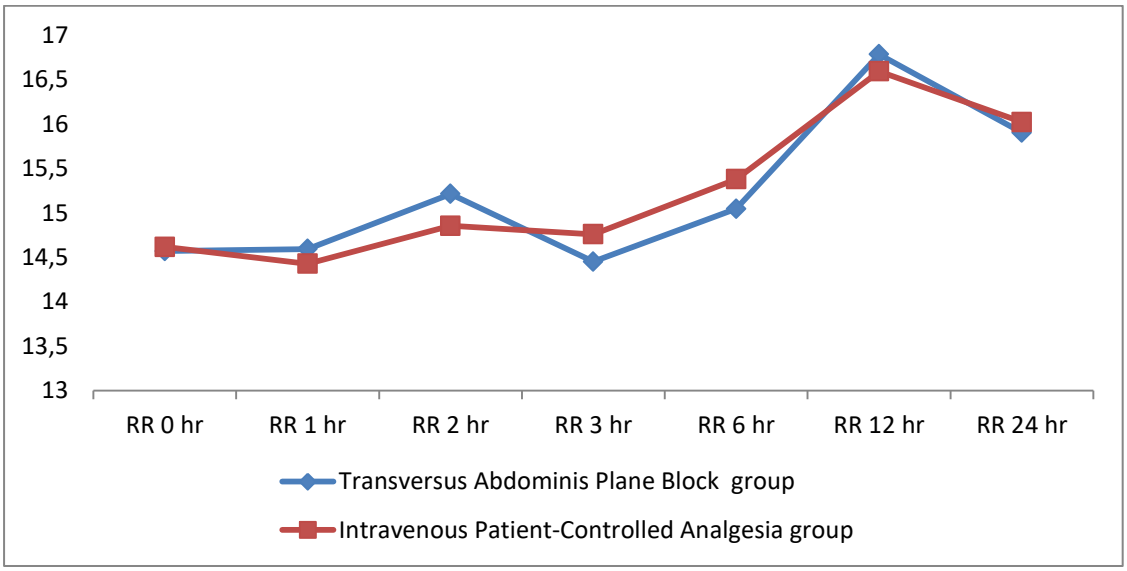

Figure (3): Mean of Respiratory rate (RR) at different point of time of both groups

Table (5): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard SPO2 at different point of time

	Studied groups		**t**	**p**
	Transversus Abdominis Plane Block group	**Intravenous Patient-Controlled Analgesia group**		
SPO2 0 hr	97-99 98.55±0.59	98-99 98.74±0.45	1.665	0.100
SPO2 1 hr	95-99 98±1.03	97-99 98.21±0.47	1.221	0.226
SPO2 2 hr	96-99 97.33±1.09	96-99 97.24±1.01	.414	0.680
SPO2 3 hr	95-99 96.9±1.26	95-99 97.43±1.56	1.688	0.095
SPO2 6 hr	97-99 97.52±0.59	96-98 97.31±0.72	1.493	0.139
SPO2 12 hr	95-99 97.52±1.19	95-99 97.26±1.62	.842	0.402
SPO2 24 hr	96-99 97.74±0.94	95-99 97.59±1.06	.654	0.515

Data were expressed as mean± SD (range), t=t test P>0.05was in significant

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There was statistically insignificant difference of both groups regard SPO2 at different time of follow up p>0.05.

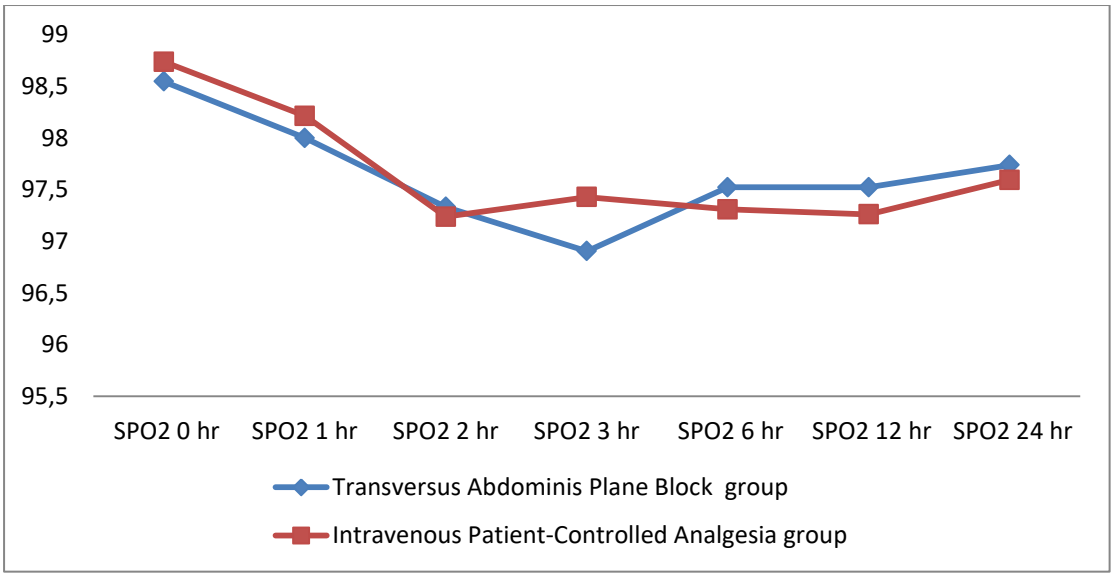

Figure (4): Mean of (SPO2) at different point of time of both groups.

Table (6): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard VAS at different point of time.

	Studied groups		**t**	**p**
	Transversus Abdominis Plane Block group	**Intravenous Patient-Controlled Analgesia group**		
VAS 1st hour	1(1-2) 1.38±0.49	2(1-2) 1.57±0.5	U=1.74	0.082
VAS 2nd hour	2(2-3) 2.26±0.44	2(1-3) 2.12±0.59	1.25	0.22
VAS 3rd hour	3(2-4) 2.71±0.74	3(1-5) 2.76±1.2	U=0.066	0.95
VAS 6 hour	4(2-5) 3.83±0.91	4(2-5) 3.78±0.56	.289	.774
VAS 12hour	2(2-3) 2.47±0.51	2(2-3) 2.38±0.49	.875	.384
VAS 24 hour	2(1-3) 2.21±0.47	2(1-3) 2±0.62	1.77	0.079

Data were expressed as mean± SD, median (range), P>0.05was in significant. t=t test U =Mann-Whitney U

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There was statistically insignificant difference of both groups regard VAS at different time of follow up p>0.05.

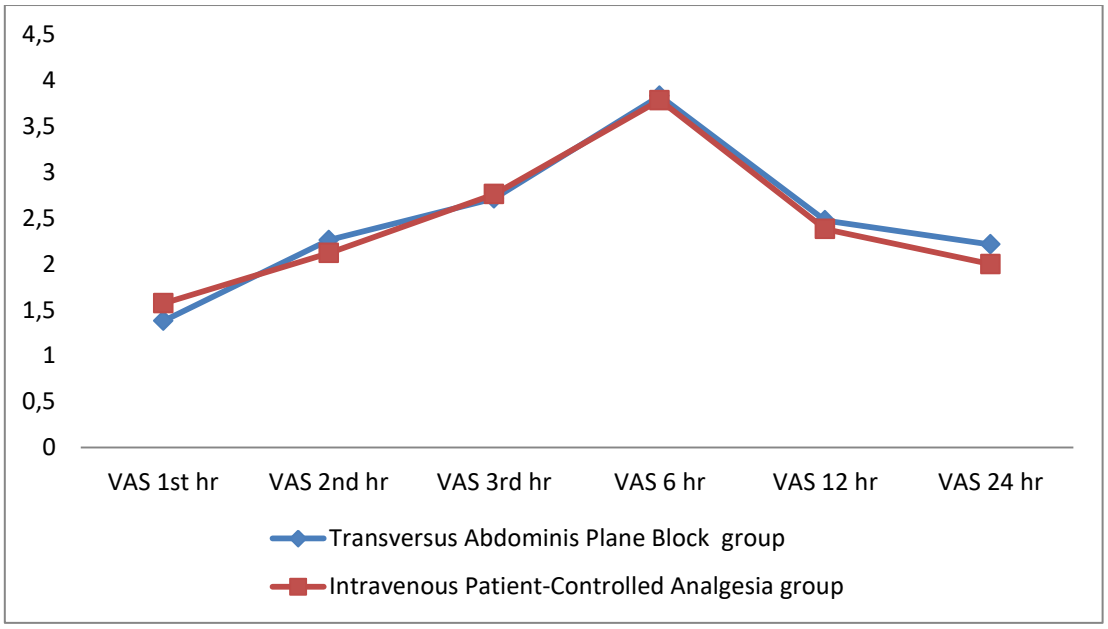

Figure (5): Mean of VAS at different point of time of both groups.

Table (7): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard additional analgesic need at different point of time

variable	Studied groups				χ^2	p-value
	Transversus Abdominis Plane Block group		Intravenous Patient-Controlled Analgesia group			
	No.	%	No.	%		
Additional analgesic need 1st hr	.	.	.	.		
no	42	100.0	42	100.0	-	-
Additional analgesic need 2nd hr	.	.	.	.		
no	42	100.0	42	100.0	-	-
Additional analgesic need 3rd hr	.	.	.	.		
no	42	100.0	40	95.2	F	0.49
yes	0	0	2	4.8	-	-
Additional analgesic need 6th hr	.	.	.	.		
No	38	90.5	40	95.2	f	0.676
yes	4	9.5	2	4.8		
Additional analgesic need 12th hr	.	.	.	.		

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No	42	100.0	42	100.0	-	-
Additional analgesic need 24th	.	.	.	.		
No	42	100.0	42	100.0	-	-

Data were expressed as number (percent), f=Fisher exact test P>0.05was in significant,

There was statistically insignificant difference of both groups regard post caesarian section additional analgesicneed at 24 hours of follow up p>0.05.

Table (8): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard occurrence of nausea and vomiting at different point of time

Variable	**Studied groups**				**χ^2**	**p-value**
	Transversus Abdominis Plane Block group		**Intravenous Patient-Controlled Analgesia group**			
	No.	%	**No.**	%		
nausea-vomiting 1hr						
no	37	88.1	6	14.3	45.79	0.000001**
yes	5	11.9	36	85.7		
nausea-vomiting 2hr	.	.	.	.		
no	36	85.7	32	76.2	1.23	0.266
yes	6	14.3	10	23.8		
nausea-vomiting 3rd hr	.	.	.	.		
no	34	81.0	27	64.3	2.93	0.087
yes	8	19.0	15	35.7		
nausea-vomiting 6 hr	.	.	.	.		
no	42	100.0	37	88.1	f	0.055
yes	0	0.0	5	11.9		
nausea-vomiting 12 hr	.	.	.	.		
no	36	85.7	32	76.2	1.23	0.266
yes	6	14.3	10	23.8		
nausea-vomiting 24 hr	.	.	.	.		
no	42	100.0	38	90.5	f	0.116
yes	0	.0	4	9.5		

Data were expressed as number (percent), χ 2 Chi square test f= Fisher Exact test P>0.05was insignificant, *P<0.05 was significant, **P<0.001 was highly significant

Table 8 define there was significant higher percent of women complaint from nausea-vomiting in Intravenous Patient-Controlled Analgesia group compared to Transversus Abdominis Plane Block group at first hour of follow up p<0.05.

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Table(9): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard resuming of the activity mobilization at different point of time

variable	Studied groups				χ^2	p-value
	Transversus Abdominis Plane Block group		Intravenous Patient-Controlled Analgesia group			
	No.	%	No.	%		
resuming of the activity, mobilization 1 hr	.	.	.	.		
no	42	100.0	42	100.0	-	-
resuming of the activity, mobilization 2 hr	.	.	.	.		
no	42	100.0	42	100.0	**-**	**-**
resuming of the activity, mobilization 3rd hr	.	.	.	.		
no	18	42.9	23	54.8	1.19	0.28
start mobilization	24	**57.1**	19	**45.2**		
resuming of the activity, mobilization 6 hr	.	.	.	.		
mobilize	24	57.1	19	38.1	1.19	0.28
Start mobilizing	18	42.9	23	61.9		
resuming of the activity, mobilization, 12 hr	.	.	.	.		
mobilize	42	100.0	42	100.0	**-**	**-**
resuming of the activity, mobilization 24	.	.	.	.		
mobilize	42	100.0	42	100.0		

Data were expressed as number (percent), χ^2 Chi square test P>0.05was in significant,

There was statistically insignificant difference of both groups regard resuming of the activity, mobilization at different time of follow up p>0.05 with resuming of the activity at 3rd hour more in transversus abdominis plane block group than intravenous patient-controlled analgesia group.

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Table (10): Comparison of Transversus Abdominis Plane Block group and Intravenous Patient-Controlled Analgesia group regard early bowel movement - feeding at different point of time

variable	Studied groups				χ^2	p-value
	Transversus Abdominis Plane Block group		Intravenous Patient-Controlled Analgesia group			
	No.	%	No.	%		
early Bowel movement -feeding 1 hr	.	.	.	.		
no	42	100.0	42	100.0	-	-
early Bowel movement -feeding 2 hr	.	.	.	.		
no	42	100.0	42	100.0	-	-
early Bowel movement -feeding 3rd hr	.	.	.	.		
no	20	47.6	22	57.1	0.76	0.38
start feeding	22	**52.4**	18	**42.9**		
early Bowel movement -feeding 6 hr	.	.	.	.		
feeding	22	52.4	18	42.9	0.76	0.38
start feeding	20	47.6	24	57.1		
early Bowel movement - feeding 12 hr	.	.	.	.		
feeding	42	100.0	42	100.0	-	-
early Bowel movement -Feeding 24	.	.	.	.		
feeding	42	100.0	42	100.0		

Data were expressed as number (percent),χ^2 Chi square test P>0.05was in significant,

There was statistically insignificant difference of both groups regard post caesarian section bowel movement - feeding at different time of follow up p>0.05 with early bowel movement -feeding at 3rd hour more in transversus abdominis plane block group than intravenous patient-controlled analgesia group.

4. DISCUSSION

The caesarean section (CS) is the most frequent major surgery, with millions of women undergoing it each year **[11].**

Because the incidence of caesarean sections has grown substantially in the last two decades, high-quality postoperative analgesia is critical because the new mother need adequate pain treatment in order to mobilize early and care for her newborn baby **[12]**.One of the major goals of post-operative treatment following the operation is pain-relieving when you awaken from anesthesia **[13].** The cornerstone of post-obstetric treatment is pain control. Pain impairs one's capacity to function and interferes with the mother's ability to care for her infant. Severe postoperative pain is

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linked to a prolonged stay in the hospital, nausea and vomiting, a decreased cough, sputum retention, atelectasis, hypoxemia, and an increased risk of cardiac disease **[14].**

A perfect post-caesarean analgesic regimen would be cost-effective, easy to administer with minimum impact on staff effort, provide high-quality pain relief, have a low incidence of side effects and complications, not interfere with nursing, and have no negative consequences on the infant **[15]**.In our study 84 parturient was randomized to undergo TAP blockor IV PCA at the end of a caesarean delivery under spinal anesthesia.

The purpose of this study was to compare PCA and TAP blocks as postoperative analgesia in caesarean section. The results showed that tap block was effective as PCA in pain management after caesarean section.

In this study there was no significant difference between two groups regarding age per year and parity of studied mothers:Age per year mean of Transversus Abdominis Plane Block group was 27.04 years and 28.74 years of Intravenous Patient-Controlled Analgesia group, the difference statistically insignificant p>0.05. Also, there was statistically insignificant difference of both groups regard parity p>0.05.

our result come in the same line with**Erbabacan E et al. [10],** who randomized 50 parturient to undergo either TAP blockor IV PCA at the end of lower abdominal surgery,they revealed that there was no significant difference in VAS and additional analgesic need in the first 24 hr. after surgery.

TAP block has also been demonstrated to provide a clear analgesic effect in individuals undergoing caesarean birth under spinal anesthesia in placebo-controlled trials **[16],** or general anesthesia **[17]**.

Also, our result come in the same line with **McDonnell et al. [6]** who randomized 50 parturient to undergo TAP block with either ropivacaine or placebo at the end of a caesarean delivery under spinal anesthesia. In the TAP group, there was a substantial reduction in morphine use, pain ratings, and side effects 48 hours after surgery.Similar advantages were reported by **Baaj JM et al.[18]** in agreement with McDonnell et al. and our study**.**

Patients who had TAP block reported less adverse effects, such as nausea, vomiting, or drowsiness, in our research. They were also satisfied with their pain management since they were able to feed and care for their kids without suffering. Our findings are consistent with a research (**Tan TT et al.[19]**) that found that patients who had TAP block were more satisfied.

Belavy et al. [20], reported that the USG-TAP block provides effective analgesia without the use of opioids following cesarean section performed with spinal anesthesia, thereby decreasing opioid-related adverse effects.

TAP block was introduced by Rafi in 2001 **[8],** He described it as block delivering local anesthetics in the TAP using the anatomical landmarks (iliac crest) by first identifying the lumbar triangle of Petit. In 2007**, Hebbard *et al*.** introduced the USG-guided approach for TAP block**[21]**.

Intravenous patient-controlled analgesia (PCA) allows patients to self-administer modest dosages of intravenous opioids to regulate their pain. Patients prefer PCA over nurse-administered analgesia on request, according to a 2015 meta-analysis, and PCA was proven to give superior pain management and greater patient satisfaction when compared to non–patient-controlled approaches **[22].**

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Parker et al. compared an intravenous PCA morphine regimen (bolus dosage 2 mg) to an intravenous PCA morphine regimen including a night-time continuous infusion (1 mg/h). Postoperative pain, sleep pattern, demand or given bolus dosage per hour, opioid intake, or recovery from surgery did not differ across groups. During the programming of the device, there were six mistakes due to the usage of a continuous infusion. Because to severe oxy-hemoglobin desaturation in three individuals, the continuous infusion had to be stopped **[23].**

Because of the potential for deleterious consequences from opioid accumulation, the ASA Task Force on Acute Pain Management advised that extra attention should be required while using a continuous infusion **[24].**

In our study, we observed that there was no significant difference between the patients who received only IV PCA or those who received only TAP block in terms of VAS values and additional analgesic need in the first 24 hours. The reason for more apparent efficiency in TAP block can be the addition of 2ml magnesium sulphate (200mg) and 2ml dexamethasone (8mg) to 18 ml 0.25% bupivacaine (45mg).

(Sachdeva and Sinha, [25]). Investigate the effect of dexamethasone as an additive to ropivacaine on the duration of ultrasound-guided transverses abdominis plane block in adult female patients who undergoing CS under subarachnoid block discovered that the time to first analgesia (TFA) was significantly longer in dexamethasone group and also postoperative tramadol requirement was decreased, while The overall amount of diclofenac ingested by the patients in the two groups did not differ considerably, which supports our findings.

Also, our findings matched those of Ammar and Mahmoud, who found that adding dexamethasone to bupivacaine during TAP block resulted in reduced postoperative VAS for pain score at 2 hours (P = 0.01), 4 hours (P = 0.01), and 12 hours (P = 0.02). TFA was also substantially prolonged (P = 0.002) in the dexamethasone group, with lower morphine needs 48 hours later (P = 0.003) **[26].**

The results of the above studies prove that dexamethasone added to local anesthetics in ultrasound-guided TAP block was a safe and effective strategy for postoperative analgesia explained by binding of dexamethasone to glucocorticoid receptors and inhibiting potassium conductance, thus reducing stimulus transmission in unmyelinated c-fibers which carry nociceptive information by inhibiting the activity of the potassium channels on these fibers. In addition, dexamethasone causes a degree of vasoconstriction to the tissues, and local anesthetic will have a slower uptake and absorption, thus prolonging its duration and comfort felt by the patient. Also, dexamethasone exhibits a potent anti-inflammatory effect by suppressing the synthesis and secretion of various inflammatory mediators' interleukins and cytokines which prolongs the period of analgesia up to 48 h **[27].**

MgSO4 inhibits the release of neurotransmitter chemicals at synaptic junctions by blocking the N-methyl D-aspartate receptor. This receptor is present in many areas of the body, including nerve terminals, and has a well-defined function in regulating pain and a number of inflammatory responses **[28].**

In another study conducted by Rana et al. a bilateral TAP block was performed on patients undergoing abdominal hysterectomy under intrathecal anesthesia, with 18 mL bupivacaine 0.25% alone or in combination with 150 mg
magnesium sulfate. Reduced pain score and rescue analgesic consumption as well as increased duration of analgesia were the outcome **[29].**

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Munshi et al. [30], also found that 300 mg MgSO4 improved postoperative analgesic duration in LSCS patients.

Comparing the effect of TAP block and IV PCA on respiratory rate, mean artreal pressure, heart rate and SpO2 our study revealed no statistically significant differences that might be explained by the low pain score in both groups p>0.05, this result is consistent with the result of the study conducted by **Erbabacan et al. (2015).**

In our study, a significant difference was not observed in the nausea-vomiting frequency except at the 1st hr. However, at the 1sthr, the nausea-vomiting frequency was higher in the PCA group. This result is consistent with the result of the study conducted by **(Sivapurapu et al.[3]).**also Erbabacan et al. (2015), carried out a study on 50 patients and evaluated morphine, which has an emetic effect, and concluded that the IV PCA patients experienced more nausea than TAP block patients at the 30th minute (p=0,04), whereas no significant difference was found in the IV PCA group and TAP block groups comparisons after the 1st hour **(Erbabacan E et al. [10]).**

We think that the higher level of nausea attributed to the emetic effect of opioids but not continuous due to the Combining dexamethasone with ondansetron in PCA.

In patients receiving fentanyl-based intravenous patient-controlled analgesia, (**Song et al. [31])** found that combining dexamethasone with ondansetron is more effective than ondansetron alone in decreasing severe nausea and vomiting.

When added to a morphine-based PCA solution, ondansetron was found to be beneficial in preventing PONV **[32].**

Also, in patients receiving a morphine-based PCA following major gynecological surgery, a combination of dexamethasone and ondansetron was more effective than ondansetron alone in avoiding PONV **[33].**

In our study, early mobilize were found to be higher in the TAP block group than in the PCA group at the 3rdhr. Opioids with its sedative effect play a role in delaying patients mobilization. This statistical difference in early mobilize values was not clinically significant.

Effective postoperative analgesia is a key factor in facilitating early postoperative mobilization. Mobilization goals after cesarean delivery should be discussed during the preoperative patient education, the present studyrevealed that, pain sensation degree (usingVAS) is decreased in both groups along the first 24 h postoperative, so the patient could mobilize after cessation of the effect of spinal anesthesia.

Early mobilization ameliorate pulmonary function and tissue oxygenation, improves insulin resistance, minimize risk of thromboembolism, and decrease length of stay **[34].**

In our study, early bowel movement were found to be higher in the TAP block group than in the PCA group in 3rd hr. which may have resulted from effect of opioids on bowel movement. This statistical difference in early bowel movement values was not clinically significant.

TAP block, according to **(Smith et al. [35])**, had no effect on gastrointestinal function recovery or length of hospital stay, including postoperative flatus and bowel movement. In contrast, TAP block improved bowel movement and reduced the length of hospital stay, according to (**Tikuisis et al [36]).**

Zafar et al showed that TAP block for laparoscopic left and right-sided colonic resections was associated with earlier return to diet and discharge than PCA or epidural **[37].**

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(Chan KC et al. [38]), morphine did not delay the recovery of bowel function after abdominal surgery if given in small doses by intravenous PCA.
(Chen, J-Y et al. [39]), addition of ketorolac in intravenous morphine PCA improve opioid-sparing effect and mildly shortens the duration of postoperative bowel immobility in colorectal surgery patients. Postoperative ileus appears to be a multifactorial problem, and opioid-induced impairment of bowel function might be overemphasized.
Our study concluded that TAP block did not have a significant impact on early bowel movement than PCA and more clinical trials are needed to substantiate this.

5. CONCLUSION

The present study demonstrated that transversus abdominis plane block is effective as IVPCA in pain control after cesarean section in the first 24hr postoperative, when add of 2ml magnesium sulphate (200mg) and 2ml dexamethasone (8mg) to 18 ml 0.25% bupivacaine (45mg). It may be more effective than IV-PCA, as the analgesic effect starts earlier and decreases the systemic effect of the opioids used in PCA.

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