Ultrasound–Guided Transversus Abdominis Plane (USG-TAP) Block during and after caesarean section for Post-Operative Pain Control

Abd El Moneem Mohamed Zakaria[1], Magdy Ahmed Abd El Momen[2], Ahmed Osama Abd El Mottal[1], Mahmoud Saeed Mahmoud Nabayel[1]

[1]Department of Obstetrics & Gynecology, Faculty of Medicine - Al Azhar University
[2]Department of Anesthesiology, Intensive care & Chronic pain, Faculty of Medicine - Al Azhar University
Email: dr.mahsaeed@gmail.com

Abstract: Background: The most common surgical procedure performed for women in the world is the cesarean section, in spite of post-operative pain which represent an issue of matters. The pain post-cesarean operation is considered the chief cause of hesitating to perform the operation. Different forms of analgesics can be given to the patients immediately post-section by different routes for relieving of pains, in the form of simple parenteral analgesics (paracetamol and NSAID's drugs) up to neuraxial narcotics. Different methods are applied parentally for relieving post-cesarean section pains involving, tranversus abdominis plane block and TAP block which can be applied either transcutaneous or by open surgical technique or can be done under ultrasound guided. **Objective:** For assessing the analgesic effect of the ultrasound-guided transverses abdominis plane (USG-TAP) block during and after cesarean section in women with respect to the pain score after cesarean section for a period of 24hrs. **Patients and Methods:** This study included 100 women will doing caesarean operation. The participating women were divided randomly into two groups using computerized randomization system: Group 1: subjects who received transverses abdominis plane block (TAP block) using bupivacaine 0.25% during caesarean section (cases50). Group 2: subjects who received ultrasound-guided TAP block using bupivacaine 0.25% after the end of caesarean section inside operating theatre (cases50). **Results:** Different parameters were matched between the two groups including post-operative nausea and vomiting, post-operative pain scoring at 3, 6, 9, 12 and 24 hours using visual analogue scale, early ambulation, the recommended doses of opioid analgesia and undesirable effects of the local anesthetic "bupivacaine" (pruritus, arrhythmia or hypotension),. TAP block during and after CS providing good analgesic effect during the 1st24 hours post-section and without non-significant variation between the two groups was recorded. **Conclusion:** It is concluded from the current study that TAP block during and after CS supplied best analgesic action along the 1st24 hours post-cesarean section, also decreased opioid consumption. And the difference was statistically insignificant between the two groups.

[Abd El Moneem Mohamed Zakaria, Magdy Ahmed Abd El Momen, Ahmed Osama Abd El Mottal, Mahmoud Saeed Mahmoud Nabayel. **Ultrasound–Guided Transversus Abdominis Plane (USG-TAP) Block during and after caesarean section for Post-Operative Pain Control.** *Life Sci J* 2019;16(4):40-49]. ISSN: 1097-8135 (Print) / ISSN: 2372-613X (Online). http://www.lifesciencesite.com. 6. doi:10.7537/marslsj160419.06.

Keywords: Ultrasound–guided transversus abdominis plane, transversus abdominis plane, post-operative nausea and vomiting

1. Introduction

Cesarean delivery is the delivery of a fetus through an abdominal wall incision (laparotomy) and an incision in the wall of the uterus (hysterotomy) [(1)].

There are various surgical techniques used by obstetricians when performing cesarean section. However, a few techniques are only used by the majority of obstetricians, including Joel-Cohen technique and pfannenstiel abdominal entry for elective cesarean section [(2)].

Childbirth is an exceptional experience in a woman's life, so it is important to apply analgesics of high efficiency for relieving pains post-section, but in addition to the desire of mother to recover quickly from major intra-abdominal surgery, similarly has to care for her coming offspring [(3)].

The American Society of Anesthesiologist and American College of Obstetricians & Gynecologists (ACOG) recommending that a mother's demand for pain control is enough indication for pain relief [(4)].

Post cesarean pain has mainly two main parts, somatic and visceral pain. The somatic pain initiating from nociceptors in the abdominal section are arises from deep and cutaneous structures, which are conducted through the anterior division of spinal segmental nerves of T10 to L1. These nerves run in anterior abdominal wall laterally among the transverses internal oblique and abdominis muscle layers, and the stimuli of the visceral uterine nociceptive arrived through afferent nerve fibers that ascend via the inferior hypogastric plexus and enter the spinal cord through the vertebrae T10- L1 spinal nerves [(5)].

There has been a dramatic increase in the cesarean section rate over the past two decades, hence, proper postoperative analgesia is crucial to the new mother for effective pain relief to allow early mobility, as well as care of her infant [6].

For pain management post-operation there are no ideal or gold standard until now, but there are several factors influencing the choice of therapies of analgesics like expectations, expected time of section, duration of surgical operation and patient choice [7]. Some hospitals might be unable to provide all options for post-operative analgesia due to the availability of suitable drugs and insufficient training of staffs; furthermore, some techniques are not used in definite obstetric conditions like bleeding disorders, local infection and pre-eclampsia [8].

An ultimate analgesic therapy used post-cesarean section is considered economically costs, so the cesarean operation should be easy to perform with high quality pain relief, cost-effective, have the least side-effects and with minimal effect on breastfeeding [9].

Subarachnoid morphine is highly effective for analgesia post-parturition. Though, its application is accompanied with recognized undesirable effects, especially pruritus, vomiting and nausea,, which decrease overall patient approval. One of the most serous side effects of analgesics or narcotics is danger of delayed maternal respiratory depression owing to rostral spreading of morphine [10].

A major part of the pain occurred post cesarean parturition is related to the anterior abdominal wall incision and wound, this can be obstructed using different local anesthetic methods, comprising iliohypogastric and ilioinguinal nerve blocks, injury infiltration and newly the transversus abdominis plane (TAP) block [11].

The relatively newly applied technique is the transversus abdominis plane (TAP) block, used for blocking of the neural afferents to the anterior abdominal muscle wall, this is achieved by injecting local infiltrating anesthetic drugs in the neurofascial plane among the transversus abdominis and internal oblique muscles [11,12].

The TAP block has proved to be effective in reducing the required dosage of intravenous morphine in women post CS and in general surgical operations after laparotomy in patients [13].

An efficient analgesic method of post-cesarean section in women is the blocking of the transversus abdominis plane (TAP). Some authors designed 2 randomized organized investigations, they demonstrated that in the first 24 hours post cesarean delivery required low dose of opioid in women giving TAP blocks [14].

TAP block provides motor and sensory block to anterior and lateral abdominal walls [14]. Moreover, by using an intra-abdominal methodology; aseptic measures can be simply achieved; visible and perceptible validation of correct location might be attained with almost no danger of injury to the inferior epigastric vessels, internal viscera and visceral organs [15].

Some authors reported that blocking of TAP is relatively novel method that might be more valuable in the control of post-CS pain. It might be appreciated source in subject's contraindicated to given long-acting neuraxial opioids or in patients experiencing general anesthesia [13].

Aim of the work

To study the analgesic impact of the ultrasound-guided transverses abdominis plane (USG-TAP) block during and after cesarean section with respect to the pain score within 24hrs post-surgery in women.

2. Patients and Methods

This study was a prospective randomized controlled trial performed on women undergoing cesarean section at Al Hussein University Hospital and Al Sahel Teaching Hospital. All recruited women were given an informed written and signed consent to participate in the study and were instructed as regard the visual analogue scale (VAS) for postoperative pain measurement.

Inclusion criteria:

Women undergoing caesarean section under spinal anesthesia. Patients who agree to participate in this study after explaining the purpose of this study.

Exclusion criteria:

Major systemic diseases as diabetes mellitus and hypertension. Chronic pain disorders as endometriosis. Abuse of drugs or alcohol. Drug allergy to any medication used in the study. Bleeding disorders. Body mass index ≥ 40. Emergency cesarean section as accidental hemorrhage fetal distress, etc.

Intervention:

The current study was included 100 women undergoing caesarean section. The patients were randomized in 2 groups using computerized randomization system: **Group 1:** subjects who received transverses abdominis plane block (TAP block) using bupivacaine 0.25% during caesarean section (cases50). **Group 2:** subjects who received ultrasound-guided TAP blok using bupivacaine 0.25% after the end of caesarean section inside operating theatre (cases50).

Randomization:

Sample randomization was done by using (Random Allocation Software, Version 1.0) (Table 1) prepared by an independent statistician.

Allocation and concealment:

A hundred opaque envelopes were numbered serially and in each envelope the corresponding number which denotes the allocated group was put according to randomization table (Table 1). Then all envelopes was closed and put in one box. When the first patient arrives, the first envelope was opened and the patient was allocated to either group 1 or group 2 according to the number inside.

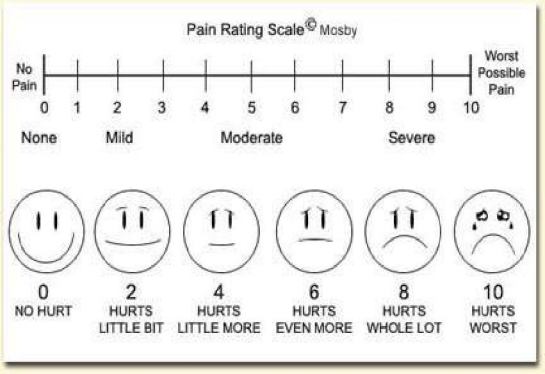
Technique of the USG-TAP block:

An ultrasound-guided TAP block was performed after the surgery, skin was prepared with 2%chlorhexidine solution and a high-frequency (13-6MHz) ultrasound probe (SonoSite M-Turbo Sonosite Inc., Bothel) was used. The injectate syringes was prepared underaseptic technique. syringes contained bupivacaine 0.25% 40ml. Ultrasound probe was positioned in mid-axillary line half way between costal margin and iliac crest. The satisfactory image was aimed to visualize the subcutaneous fat, external oblique muscle, internal oblique muscle, transverses abdominis muscle, peritoneum, and intraperitoneal cavity. A 100 mm long 20G short bevel needle (Stimuplex A B/BRAUN Melsungen AG, Germany) was inserted in plane to the probe of the ultrasound anteriorly to lie between internal oblique muscle and transverses abdominis muscle, a total of 20 ml study solution was injected in each side (left and right). Successful injection was obtained when an echoluescent lens-shape appeared between the two muscles. The same procedure is performed on the opposite side. All patients received the conventional analgesic methods in the form of paracetamol as post-operative analgesia. Conventional analgesia included intravenous paracetamol ex. (Perfalgan 1000 mg) every 8 hours. Opioid analgesics in the form of IV nalbuphine ex. (Nalufin 20 mg) was given to patients of the two groups when needed. Comparison between the two groups included pain scoring, postoperative nausea and vomiting, early ambulation and the required doses of opioid analgesia. Monitoring for toxicity after injection is mandatory.

Pain scoring:

Patients were educated by the researcher about how to inform the assessors about the variable degrees of pain using the visual analogue score. The visual analog scale (VAS) pain scores were collected at rest and on movement at 3, 6, 9, 12 and 24 hours after completion of the TAP block. Patients were asked to mark their pain scores on a VAS (0 to 10cm, with an unmarked line in which 0cm = no pain and 10cm = worst pain) [16].

Narcotic consumption, as well as adverse effects such as nausea, vomiting, pruritus and their treatments, was also assessed at these time intervals.



Objectives of this study:

Primary objective:

Assessing the pain score in the postoperative period after the TAP block.

Secondary objectives: Postoperative nausea and vomiting. Early ambulation. Required doses of opioid analgesics and their adverse effects. Complications for example anterior abdominal wall hematoma.

Sample size justification:

Sample size was calculated using EpiInfo version 6.0, setting the power (β) at 80% and alpha error at 0.05. Confidence interval equals (1-α) = 95%. Risk ratio equals 1.5. Data from a previous study, indicated that TAP blocks provide postoperative analgesia comparable to that of placebo after cesarean section. Calculation according to these data produced a minimal sample size of 50 cases.

Ethics:

The study was approved from the Ethical Committee of the department of Obstetrics and Gynecology, Faculty of Medicine, Al Azhar University. Informed written consent was taken from all participants before recruitment in the study, and after explaining the purpose and procedures of the study.

Data Collection:

Data or results were collected after arrangement in a suitable manner by a process known as processing of data which may be manual or computerized. This data should be confidentially protected. The pain score in the postoperative period after the USG-TAP block. Required doses of opioid analgesics and their adverse effects. Complications for example anterior abdominal wall hematoma.

Statistical analysis:

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

Independent-samples t-test of significance was used when comparing between two means. Mann Whitney U test: for two-group comparisons in non-parametric data. Chi-square (x^2) test of significance was used in order to compare proportions between qualitative parameters. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: Probability (P-value): P-value ≤0.05 was considered significant. P-value ≤0.001 was considered as highly significant. P-value >0.05 was considered insignificant.

3. Results

Table (1): Comparison between groups according to demographic data.

Demographic data	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*t/x2#*	*p-value*
Age (years)				
Mean±SD	27.44±4.64	26.24±4.63	1.632	0.196
Range	19-38	18-38		
BMI [wt/(ht)^2]				
Mean±SD	24.74±5.03	23.06±4.26	2.246	0.247
Range	18-35	18-35		
Parity				
P1	14 (28.0%)	19 (38.0%)	4.681	0.128
P2	16 (32.0%)	9 (18.0%)		
P3	7 (14.0%)	1 (2.0%)		
PG	13 (26.0%)	21 (42.0%)		

t-Independent Sample t-test; #x2: Chi-square test p-value >0.05 NS

This table shows no statistically significant difference between groups according to demographic data.

Table (2): Pain At rest descriptive of the group I: during CS.

Pain At Rest	Range	Mean±SD	Median (IQR)
After 3hrs	2-9	5.50±1.75	6(3)
After 6hrs	2-8	4.86±1.98	5(2)
After 9hrs	2-8	4.14±1.81	4(2)
After 12hrs	2-8	3.78±1.80	4(2)
After 24hrs	2-5	3.36±0.98	4(2)

Data are expressed mean and standard deviation Data are expressed median and interquartile range (IQR)

Table (3): Pain At rest descriptive of the group II: After CS.

Pain At Rest	Range	Mean±SD	Median (IQR)
After 3hrs	2-9	5.78±1.80	6(4)
After 6hrs	2-10	4.98±1.72	4(2)
After 9hrs	2-10	4.32±1.88	4(1)
After 12hrs	2-8	3.84±1.56	4(2)
After 24hrs	2-8	3.56±1.63	4(3)

Data are expressed mean and standard deviation Data are expressed median and interquartile range (IQR)

Table (4): Comparison between groups according to pain at rest.

Pain At Rest	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*z-test*	*p-value*
After 3hrs				
Mean±SD	5.50±1.75	5.78±1.80	0.621	0.432
Median (IQR)	6(3)	6(4)		
Range	2-9	2-9		
After 6hrs				
Mean±SD	4.86±1.98	4.98±1.72	0.105	0.747
Median (IQR)	5(2)	4(2)		

Pain At Rest	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*z-test*	*p-value*
Range	2-8	2-10		
After 9hrs				
Mean±SD	4.14±1.81	4.32±1.88	0.238	0.626
Median (IQR)	4(2)	4(1)		
Range	2-8	2-10		
After 12hrs				
Mean±SD	3.78±1.80	3.84±1.56	0.032	0.859
Median (IQR)	4(2)	4(2)		
Range	2-8	2-8		
After 24hrs				
Mean±SD	3.36±0.98	3.56±1.63	0.551	0.46
Median (IQR)	4(2)	4(3)		
Range	2-5	2-8		

z-Mann-Whitney test; p-value >0.05 NS

The data in the table demonstrate a non-significant variation among groups according to Pain At Rest.

TAP block during CS showing pain score after 3hrs,6hrs,9hrs,12hrs,24hrs (Mean±SD 5.50±1.75, 4.86±1.98, 4.14±1.81, 3.78±1.80, 3.36±0.98).

TAP block after CS showing pain score after 3hrs,6hrs,9hrs,12hrs,24hrs (Mean±SD 5.78±1.80, 4.98±1.72, 4.32±1.88, 3.84±1.56, 3.56±1.63).

Table (5): Pain At movement descriptive of the group I: during CS.

Pain At Movement	Range	Mean±SD	Median (IQR)
After 3hrs	2-10	6.16±2.16	7(4)
After 6hrs	2-9	5.36±2.42	5(3)
After 9hrs	2-9	4.42±2.20	4(3)
After 12hrs	2-9	3.98±2.15	4(2)
After 24hrs	2-6	3.44±1.15	4(2)

Data are expressed mean and standard deviation
Data are expressed median and interquartile range (IQR)

Table (6): Pain At movement descriptive of the group II: After CS.

Pain At Movement	Range	Mean±SD	Median (IQR)
After 3hrs	2-10	6.38±2.25	7(5)
After 6hrs	2-10	5.44±2.09	4(3)
After 9hrs	2-10	4.58±2.20	4(2)
After 12hrs	2-9	4.06±1.91	4(2)
After 24hrs	2-9	3.82±2.02	4(4)

Data are expressed mean and standard deviation
Data are expressed median and interquartile range (IQR)

Table (7): Comparison between groups according to pain at movement.

Pain At Movement	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*z-test*	*p-value*
After 3hrs				
Mean±SD	6.16±2.16	6.38±2.25	0.249	0.619
Median (IQR)	7(4)	7(5)		
Range	2-10	2-10		
After 6hrs				
Mean±SD	5.36±2.42	5.44±2.09	0.031	0.86
Median (IQR)	5(3)	4(3)		

Pain At Movement	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*z-test*	*p-value*
Range	2-9	2-10		
After 9hrs				
Mean±SD	4.42±2.20	4.58±2.20	0.132	0.717
Median (IQR)	4(3)	4(2)		
Range	2-9	2-10		
After 12hrs				
Mean±SD	3.98±2.15	4.06±1.91	0.039	0.845
Median (IQR)	4(2)	4(2)		
Range	2-9	2-9		
After 24hrs				
Mean±SD	3.44±1.15	3.82±2.02	1.342	0.25
Median (IQR)	4(2)	4(4)		
Range	2-6	2-9		

z-Mann-Whitney test; p-value >0.05 NS

The data in the table demonstrate a non-significant variation among groups according to Pain At Movement.

TAP block during CS showing pain score after 3hrs,6hrs,9hrs,12hrs,24hrs (Mean±SD 6.16±2.16, 5.36±2.42, 4.42±2.20, 3.98±2.15, 3.44±1.15).

TAP block after CS showing pain score after 3hrs,6hrs,9hrs,12hrs,24hrs (Mean±SD 6.38±2.25, 5.44±2.09, 4.58±2.20, 4.06±1.91, 3.82±2.02).

Table (8): Comparison between groups according to postoperative nausea & vomiting.

Postoperative Nausea & Vomiting	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*x2*	*p-value*
No	42 (84.0%)	45 (90.0%)	0.796	0.372
Yes	8 (16.0%)	5 (10.0%)		

x2: Chi-square test; p-value >0.05 NS

The data in the table demonstrate a non-significant variation among groups according to postoperative nausea and vomiting.

Table (9): Comparison between groups according to ambulation (hrs).

Ambulation (hrs)	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*t-test*	*p-value*
Mean±SD	2.00±0.91	2.04±1.32	0.031	0.860
Range	1-5	1-5		

t-Independent Sample t-test; p-value >0.05 NS

The data in the table demonstrate a non-significant variation among groups according to ambulation (hrs).

Table (10): Comparison between groups according to need of opioids.

Need of opioids	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*x2*	*p-value*
No Need	42 (84.0%)	40 (80.0%)	1.446	0.695
One Doses	1 (2.0%)	1 (2.0%)		
Two Doses	5 (10.0%)	4 (8.0%)		
Three Doses	2 (4.0%)	5 (10.0%)		

x2: Chi-square test; p-value >0.05 NS

The data in the table demonstrate a non-significant variation among groups according to need of opioids.

Table (11): Comparison between groups according to effectiveness.

	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*x2*	*p-value*
Effective	42 (84.0%)	40 (80.0%)	0.068	0.795
Not Effective	8 (16.0%)	10 (20.0%)		

x2: Chi-square test; p-value >0.05 NS

This table shows that the effectiveness of TAP block in group I during CS (84%) compared to (80%) effectiveness in group II After CS, there is no significant difference both group.

Table (12): Comparison between groups according to complications.

Complications	Group I: During CS *(n=50)*	Group II: After CS *(n=50)*	*x2*	*p-value*
No	50 (100.0%)	50 (100.0%)	0.000	1.000
Yes	0 (0.0%)	0 (0.0%)		

x^2: Chi-square test; p-value >0.05 NS

The data in the table demonstrate a non-significant variation among groups according to complications.

4. Discussion

Cesarean section is considered one of the more usually applied surgical operations along the world. Cesarean sections represent globally about 15% of deliveries and reached 21.1% of deliveries in developed countries [(17)].

The decision of women to perform cesarean section is critical for the fear from intra - and post-surgical pains. It is of important to use a good analgesics carrying minimal undesirable side effects to achieve early mobility, early engagement with the baby and dimishing chronic pains post-delivery [(18)].

Post cesarean pain has mainly two main parts, somatic and visceral pain. The somatic pain initiating from nociceptors in the abdominal section are arises from deep and cutaneous structures, which are conducted through the anterior division of spinal segmental nerves of T10 to L1. These nerves run in anterior abdominal wall laterally among the transverses internal oblique and abdominis muscle layers, and the stimuli of the visceral uterine nociceptive arrived through afferent nerve fibers that ascend via the inferior hypogastric plexus and enter the spinal cord through the vertebrae T10- L1 spinal nerves [(5)].

A regional analgesic approach which used for blocking of the transversus abdominis plane (TAP), where it block nerve branches in T6-L1. In addition it play a role for relieving of postoperative pain resulting from lower abdominal operations [(19)]. This technique of analgesia is easy to perform, safe and is a possible alternative to spinal opioid analgesic post-cesarean incision, and can be directed by ultrasound traditional or by anatomic landmarks [(20)].

The addition of the transversus abdominis plane (TAP) block to a multimodal analgesic technique, not comprising a long-acting intrathecal opioid, decreased significantly the dosage of opioid needed for relieving of pain post-CS [(11)]. The required doses of i.v. morphine is reduced significantly in patients will doing midline laparotomies under general anesthesia, after TAP block [(21)].

After the initial description of the technique by ***Rafi*** [(22)], over the past few years, many investigations throw a light on the the advantages of the transversus abdominis plane (TAP) block in decreasing the dosages of opiod drugs and relieving of pain post-surgical operations in the abdomen.

This study was aimed to assessing the analgesic effect of the ultrasound-guided transverses abdominis plane (USG-TAP) block during and after cesarean section as after 24 hrs post incision (the pain score) in women.

This study was a randomized controlled trial performed on women undergoing cesarean section at Al Hussein University Hospital and Al Sahel Teaching Hospital.

This study included 100 subjects designed to perform caesarean operation. The women are divided randomly into two groups using computerized randomization system: **Group 1:** subjects who received transverses abdominis plane block (TAP block) using bupivacaine 0.25% during caesarean section (cases50). **Group 2:** subjects who received ultrasound-guided TAP block using bupivacaine 0.25% after the end of caesarean section inside operating theatre (cases50).

In the current study, TAP block during and after CS are superior than the control group and the differences are non-significant, where TAP bloch gave a good analgesic action along the 1st 24 hours post-cesarean incision.

In the current study, the pain scores at rest (Mean±SD) during CS in women received TAP block averaged (5.50±1.75, 4.86±1.98, 4.14±1.81, 3.78±1.80, 3.36±0.98). While the pain scores

(Mean±SD) at rest after CS in women received ultrasound-guided TAP block was averaged (5.78±1.80, 4.98±1.72, 4.32±1.88, 3.84±1.56, 3.56±1.63) at 3, 6, 9, 12 and 24 hours post-operative respectively with (P-value >0.05).

Pain scores were also studied during movement at 3, 6, 9,12 and 24 hours, pain scores at movement are average of (Mean±SD 6.16±2.16, 5.36±2.42, 4.42±2.20, 3.98±2.15, 3.44±1.15) during CS while pain scores after CS are average (Mean±SD 6.38±2.25, 5.44±2.09, 4.58±2.20, 4.06±1.91, 3.82±2.02) with (P-value >0.05).

The use of TAP block as a modality for post cesarean section pain relief has been evaluated in many studies.

Owen and his colleagues, studied the impact of TAP block on 16 patients gave conventional analgesics and 18 women given only conventional analgesics, they reported that surgical TAP block was better in relieving the pains post operation than group treated with only conventional analgesics (categorical pain severity at 6-9 hrs: was 1 and 2 in groups TAP and the conventional analgesic only ($P < 0.01$), respectively. In addition to lowering in the consumed morphine [(15)]. The data obtained by ***Owen et al.*** [(15)] were in agreement with our finding in the current work, though, in the present work there was noticeable variation in the degree of pain scores in women received ultrasound-guided TAP block and the other group which treated with TAP saline at interval of 3, 6, 9 and 12 hours during rest and during movement ($p < 0.001$), however, this variation in the degree of pain scores was not noticeable at 24 hours after incision.

Baaj and his colleagues studied the effect of analgesics on 40 women undergoing to cesarean section. They treated with local anesthetic or saline TAP blocks, beside spinal block by using bupivacaine. By using VAS score, a significant lower 24 hours post incision, in addition to a higher in satisfaction after applying the local anesthetic TAP block was observed in comparison to control group [(14)]. These results were similar to the results in the present study.

In the current work, TAP block was carried out under ultrasound guide through transcutaneous approach when the skin is closed, in comparison with several studies which used blindly anatomical landmarks for evaluating the efficiency of the TAP block. The advantages of using ultrasounds as a guide during TAP block in overcoming the problem of impalpable muscle landmarks for the reason that they permit real-time visualization of the needle, tissues and the infusion of local infiltrative anesthetic solution [(23)], the end result was nerves block at the suitable neurovascular plane.

Costello and his colleagues [(13)] also studied the effect of TAP block, in addition to a multimodal analgesic protocol including the use of intrathecal morphine for post cesarean section pain relief, they concluded that the TAP didn't improve the quality of post cesarean section pain relief (VAS at rest at 6 hours was average of 10 mm for control group compared to 20 mm in the study group P value<0.06, VAS at rest at 12 hours was average of 10 mm for both groups, VAS at rest at 24 hours was average of 20 mm for both groups) [(13)].

The inconsistent results might relate to that is the dosage of local infiltrative anesthesia, where no definite or standard doses in most of studies are described. which may lead to disagreement in the analgesic action [(13)] they used total of 75mg of ropivacaine in each side, while other studies opposing their results like [(24)] used doses up to 150mg bupivacaine per side, so they assumed that the difference in the results may be related to the different dosage. In the current study, 20 ml of bupivacaine 0.25% (50 mg of bupivacaine) was used in every side which equal to the used dose in the TAP block performed by ***Owen et al.*** [(15)], though they proposed that their findings concerning TAP block was more efficient in relieving of pain post CS.

The opioid consumption in the current study revealed that 8 patients in group 1 who received TAP block during CS needed nalufin 10 mg while 10 patients in group 2 who received ultrasound guided TAP block after CS needed 20 mg nalufin with statistically insignificant difference between the two groups.

Kanazi and his colleagues also assessed the patients at 2, 4, 6 and 12 hours after performance of TAP block. They showed that the most variation was in initial treatment with morphine and detecting of pain scores before 12 hrs post procedure ***Kanazi et al.*** [(16)] which was similar to our results.

Owen and his colleagues also evaluated the required doses or consumed of morphine over the 24 hours post-operation, which verified that it was lower in the surgical TAP group [(15)].

In a review article made by ***Young and his colleagues (2012)*** they compared different studies that performed TAP block using different techniques for various abdominal surgeries, they concluded that the TAP block was an effective modality for post-operative pain relief in most of the studies, however, it added no value when compared to intrathecal morphine. Moreover, the optimal dosing, use of intermittent injection through retained catheters, type of anesthetic used and the optimal technique that provides the best outcome have to be well examined in further studies. Although data from this review article may be encouraging regarding use of the TAP

block, yet most of the studies where the data was collected from used the open surgical approach, with few studies have used the ultrasound guided approach [(25)].

In the current study, ultrasound-guided technique was used to inject the local anesthetic in the proper neurovascular plane, a technique similar to the method described by ***Belavy et al.*** [(20)].

There were no complications related to the procedure due to direct injection after identification of the three muscular layers of the abdominal wall on the screen and direct vision of neurovascular plane, additionally, the procedure was easy and fast, Moreover, we could ensure that all the injected local anesthetic infiltrated the right plane.

Finally that, TAP block is fast and simple in performance, and relatively safer than other regimens that can be participated as a part of multimodal analgesia post-cesarean incision.

Conclusion

In the current study, a different technique for transversus abdominis plane block, in which ultrasound guided transcutaneous approach was used, has been performed on patients undergoing cesarean section. TAP block during and after CS was statistically non-significant between the two groups, in spite of it gave good analgesic effect along the 1st24 hours post-cesarean section.

References

1. Saju J and Stephen A (2011): Cesarean Delivery. Medscape. and Gynecology /Labor and Delivery. Retrieved 5/1/2011 from http://eMedicine.Medescape.com/Obstetrics.
2. Gates S, Fully L, Brocklehurst P (2002): Surgical techniques used during cesarean section operations: Results of a national survey of practice in the UK. Eur J Obstet Gynecol Repord Biol; 102(2):120-6.
3. Goodman P, Mackey C, Tavakoli (2004): Factors related to childbirth satisfaction. J Adv Nurs; 46(2):212-9.
4. American College of Obstetricians and Gynecologists (2002): ACOG Committee Opinion number 269. analgesia and cesarean delivery rates. Obestet Gynacol; 99(2):369-70.
5. Moore K (2014): Neurovasculature of anterolateral abdominal wall. Clinically Oriented Anatomy, 7th Ed. Philadelphia: Williams and Wilkins; p. 193-201.
6. Churchill H, Savage V, Francome C (2006): Cesarean birth in Britain. London: Middlesex University Press.
7. Keogh E, Hughes S, Ellery D, Daniel C, Holdcroft A (2006): Psychosocial influences on women"s experience of planned elective cesarean section. Psychosom Med; 68(1):167-74.
8. Gadsden J, Hart S, Santos AC (2005): Post - cesarean delivery analgesia. Anesth Analg; 101(5 Suppl): S62-69.
9. Lavand'homme P (2006): Post cesarean: effective strategies and association with chronic pain. Curr Opin Anaesthesiol; 19(3):244-8.
10. Dahl JB, Jeppesen IS, Jorgensen H, Wetterslev J, Moiniche S (1999): lntraoperative and postoperative analgesic efficacy and adverse effects of intrathecal opioids in patients undergoing cetacean section with spinal anesthesia: qualitative and quantitative systematic review of randomized controlled trials. Anesthesiology: 91(6):1919-27.
11. McDonnell JG, O'Donnell BD, Farrell T, Gough N, Tuite D, Power C, Laffey JG (2007): Transversus abdominis plane block: a cadaveric and radiological evaluation. Reg Anesth Pain Med; 32(5):399-403.
12. Munishankar B, Fettes P, Moore C, McLeod GA (2007): A double- blind randomized controlled trial of paracetamol, diclofenac or the combination for pain relief after cesarean section. Int. J Obstet Anaesth; 17(1):9-14.
13. Costello JF, Moore AR, Wieczorek PM, Macarthur AJ, Balki M, Carvalho JC (2009): The transversus abdominis plane block, when used as part of a multimodal regimen inclusive of intrathecal morphine, does not improve analgesia after cesarean delivery. Reg Anesth Pain Med; 34(6):586-9.
14. Baaj JM, Alsatli RA, Majaj HA, Babay ZA, Thallaj AK (2010): Efficacy of ultrasound-guided transversus abdominis plane (TAP) block for post-cesarean section delivery analgesia, a double-blind, placebo-controlled, randomized study. Middle East J Anesthesiol; 20(6):821-6.
15. Owen DJ, Harrod I, Ford J, Luckas M, Gudimetla V (2011): The surgical transversus abdominis plane block-a novel approach for performing anestablished technique. BJOG; 118(1):24-7.
16. Kanazi GE, Aouad MT, Abdallah FW, Khatib MI, Adham AF, Harfoush DW, and Siddik-Sayyid SM (2010): The analgesic efficacy of subarachnoid morphine in comparison with ultrasound-guided transversus abdominis plane block after cesarean delivery: A randomized controlled trial. Anesth Analg; 11(2):475-81.
17. Gibbons L, Belizan JM, Lauer JA, Betran AP, Merialdi M and Althabe F (2012): Inequities in the use of Caesarean section deliveries in the world. Am J ObstetGynecol; 206: 331 – 19.

18. Patel SA, Gotkin J, Huang R, Darling C, Pates JA, Dolinsky B. (2012): Transversusabdominis plane block for postoperative analgesia after cesarean delivery. JMatern Fetal Neonatal Med; 25:2270–2273.
19. Marhofer P (2010): Ultrasound Guidance in Regional Anaesthesia. Principles and practical implementation, New York, USA, Oxford University Press. www.usra.ca
20. Belavy D, Cowlishaw PJ, Howes M, Phillips F (2009): Ultrasound-guided transversus abdominis plane block for analgesia after Cesarean delivery. Br J Anaesth; 103(5):726-30.
21. Carney J, Lane J, Quondamatteo F (2008): Defining the limits and the spread beyond the transverse abdominal plane block: radiological and anatomical study. Reg Anesth Pain Med; 33(S1):e7.
22. Rafi AN (2001): Abdominal field block: a new approach via the lumbar triangle. Anaesthesia; 56:1024-6.
23. Hebbard PD, Barrington MJ, Vasey C (2010): Ultrasound-guided continuous oblique subcostal transversus abdominis plane blockade: description of anatomy and clinical technique. Reg Anesth Pain Med; 35:436-41.
24. McDonnell JG, Curley G, Carney J, Benton A, Costello J, Maharaj CH, Laffey JG (2008): The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a randomized controlled trial. Anesth Analg; 104(1):193-7.
25. Young MJ, Gorlin AW, Modest VE, Quraishi SA (2012): Clinical implications of the transversus abdominis plane Block in Adults. Anesthesiology research and practice; 2012, Article ID 731645.

4/7/2019