

Comparative Study between Different Techniques of Abdominal Wall Blocks and Their Effect on Post Operative Pain Relief in Patients Undergoing Laparotomy Using Ultra-Sound

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Abstract

Background: Pain after abdominal surgery is derived from the abdominal wall incision several approaches developed to provide post-operative analgesia after abdominal incision via blockage of the sensory nerve supply to the anterior abdominal wall.

Subjects and Methods: Twenty eight adult patients undergoing laparotomy were randomized into two equal groups. Those in Group A received combined TAPB & TFPB and those in Group B received TAPB alone. VAS done post-operative at rest and at movement, extra analgesic requirements and complications recorded.

Conclusion: Our study demonstrates that real time ultrasound guided combined TAP and TFP block provides additional benefit to multimodal analgesia in adults undergoing laparotomy. The patients who received combined TAP and TFP block required less intraoperative analgesic requirements, as well as postoperative rescue analgesia than patients who received TAP block alone.

Key Words: Abdominal wall blocks – Analgesia – Ultra-sound – Opioid sparing effect – Post-operative.

Introduction

THE use of ultrasound for the placement of peripheral nerve blocks has received a great deal of attention lately in the anesthesiology literature and is beginning to solidify a place in clinical practice [1]. Claimed benefits of ultrasound-guided regional anesthesia include that it is easier to learn and quicker to perform, has a faster onset, results in higher success rates, results in more complete blocks, requires lower volumes of local anesthetic, and increases safety [2].

A substantial component of the pain experienced by patients after abdominal surgery is derived from

the abdominal wall incision. The abdominal wall is innervated by nerve afferents that course through the transversus abdominis neuro-fascial plane [3].

Abdominal field blocks have been around for a long time and have been extensively used. They, however, provide limited analgesic fields; hence multiple injections are usually required. Traditionally these blocks have blind end points (pops) making their success unpredictable [4].

The description of the landmark technique for performing posterior Transversus Abdominis Plane (TAP) block advocated a single entry point, the triangle of Petit, to access a number of abdominal wall nerves hence providing more widespread analgesia. More recently, ultrasound guided TAP block has been described with promises of better localization and deposition of the local anesthetic with improved accuracy [5].

Pain assessment techniques can be classified as self-report; behavioral observation, or physiologic measures. Assessments that use multiple measures (behavioral and physiologic) and that assess different aspects of the pain experience may result in more accurate appraisal of patients pain experiences [6].

Although acute pain is only one of the important triggers of the injury response, as the magnitude and duration of the response is related to the magnitude and duration of the stimulus, effective pain relief can have a significant impact on the injury response [7].

Regional anesthesia and analgesia techniques are commonly advocated for pain control in patients surgical practice. Regional techniques decrease parenteral opioids requirements and improve the

quality of post operative pain control and patient-satisfaction. TAP block and TFB block is introduced into patients practice in most institutes [8].

Material and Methods

This study was performed in Kasr Al-Ainy Hospital of Cairo University after obtaining approval by the Hospital Ethics Committee, and a written informed consent from the patients start from April 2012 to March 2014. Patients were randomly allocated by a computer-generated table into one of the 2 study groups; the randomization sequence was concealed in sealed envelopes. Twenty eight patients undergoing laparotomy were enrolled in the study. Group A → combined TAPB & TFPB (n=14) underwent Ultrasound (U.S) guided Transversus Abdominis Plane (TAP) block combined with Transversalis Fascia Plane (TFP) block after induction of general anaesthesia and Group B → TAPB (n=14) underwent Ultrasound (U.S) guided Transversus Abdominis Plane (TAP) block only after induction of general anaesthesia. All patients were assessed clinically and investigated for exclusion of any contraindication.

Laboratory work needed was: Complete Blood Count (CBC); prothrombin time and concentration (PT & PC); Partial Thromboplastin Time (PTT); Bleeding Time (BT); Clotting Time (CT) and liver function tests. The ultrasound machine and scanning probe should be prepared before patient entry to operating room. The ultrasound used was Concept 1000 (European, Serial No 2105); the scanning probe was curved multi-frequency transducer; the needle used was the Uniever (20G/90mm). After insertion of venous access, all patients received premedication in the form of metocloperamide at a dose of 10mg and ranitidine 50mg I.V. Perioperative monitoring included continuous ECG, pulse oximetry, non-invasive arterial blood pressure, and capnography.

Anesthesia was induced with IV fentanyl (1-1.5micg/kg to a maximum of 150mic/kg), propofol (2-3mg/kg) and atracurium (0.5mg/kg). Anesthesia was maintained by isoflurane (1-1.5%) and atracurium (10mg/20-30min). After induction and 20min before skin incision either technique of blocks were performed. In all study groups, the patient was supine while performing the block and sterilization of the site of the ultrasound and needle entry was performed using Betadine from midline to posterior axillary line between costal margin above and upper border of iliac crest below.

Post-operative after completion of surgical procedure and emergence from anesthesia the

patient was referred to PACU. All patients were put on oral paracetamol 500mg three times/day. Quality of analgesia was assessed immediately postoperative then at 1, 2, 4, 8, 12 and 24 hours postoperatively via Visual Analogue Scale (VAS) at rest and during movement. Intra-venous morphine (0.1mg/kg) increments were given when VAS at rest was >3 or at cough >5. If there were nausea or vomiting ranitidine (0.5mg/kg) and metocloperamide (0.1mg/kg) were given.

Statistical analysis and sample size calculation:

Data were statistically described in terms of mean Standard Deviation (SD), median and range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups was done using Student *t*-test for independent samples when normally distributed and Mann Whitney U test for independent samples when not normally distributed. For comparing categorical data, Chi square (2) test was performed. Exact test was used instead when the expected frequency is less than 5. *p*-values less than 0.05 was considered statistically significant. All statistical calculations were done using computer program SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows.

Results

This was a randomized controlled trial performed in Kasr Al-Ainy Hospital of Cairo University after obtaining approval by the Hospital Ethics Committee, and a written informed consent from the patients between May 2012 and April 2014. Twenty eight patients undergoing laparotomy were enrolled in the study. They were randomly allocated by a computer-generated table into one of the 2 study groups; the randomization sequence was concealed in sealed envelope.

Patients' characteristics including age, gender, A.S.A, body mass index (demographic data), and duration of surgical procedure are demonstrated in (Table 1). There was no significant difference in the demographic data of all two groups of the study.

Table (1): Patient demographic data + surgical time (n=28) expressed as mean ± SD.

Item	TAPB & TFPB Group (A) (n=14)	TAPB Group (B) (n=14)	<i>p</i> -value
Age (yrs)	30.79±6.229	31.36±7.196	0.836
A.S.A	1.50±0.519	1.64±0.633	0.584
Height (cm)	166.07±5.609	170.36±6.344	0.108
BMI (kg/m ²)	35.14±3.394	36.07±2.947	0.430
Surgical time (min)	106.07±19.921	107.14±12.967	0.766

Comparing the 2 pain scores: The V.A.S at rest (Table 2) and at movement (Table 3) of the two groups immediately postoperative and then at 1, 2, 4, 8, 12 and 24 hours postoperatively revealed that the median VAS scores of Group B (TAP block alone) at rest and at movement were higher than Group A (combined TAP and TFP block) with statistically significant difference in the analgesic effect of the two groups.

At all times, the visual analogue pain score in Group A and Group B showed statistically significant differences between the median V.A.S of the two groups except VAS-at rest-8h (time 5) (with *p*-value 0.161) and VAS-at movement-12h (time 6) (with *p*-value 0.093).

Table (2): Median and range of V.A.S at rest for the two groups.

Group	A (n=14)		B (n=14)		<i>p</i> -value
	Median	Range	Median	Range	
Time 1	0.00	0-1	1.00	0-2	0.017
Time 2	0.00	0-2	1.00	0-3	0.046
Time 3	0.00	0-2	2.00	0-3	0.011
Time 4	1.00	0-3	3.00	0-5	0.020
Time 5	3.00	1-4	3.00	2-5	0.161
Time 6	3.00	3-5	4.00	2-6	0.049

Time 1: Immediately post operative.
 Time 2: 1 hours after. Time 5: 8 hours after.
 Time 3: 2 hours after. Time 6: 12 hours after.
 Time 4: 4 hours after. Time 7: 24 hours postoperative.

Table (3): Median and range of V.A.S at movement for the two groups.

Group	A (n=14)		B (n=14)		<i>p</i> -value
	Median	Range	Median	Range	
Time 1	0.00	0-1	1.00	0-4	0.021
Time 2	0.00	0-3	2.00	0-4	0.005
Time 3	1.00	0-3	3.00	0-5	0.006
Time 4	3.00	1-4	4.00	1-7	0.012
Time 5	3.50	2-7	5.00	3-7	0.008
Time 6	5.00	4-7	6.50	3-8	0.093
Time 7	7.00	5-9	8.50	4-10	0.004

Time 1: Immediately post operative.
 Time 2: 1 hours after. Time 5: 8 hours after.
 Time 3: 2 hours after. Time 6: 12 hours after.
 Time 4: 4 hours after. Time 7: 24 hours postoperative.

The time to first request for morphine was significantly prolonged in the combined TAP and TFP (Group A) compared with the TAP alone (Group B) (*p*=0.019). The subsequent doses of morphine were required at significantly longer time intervals in the Group A than in the Group B (*p*=0.009). A significant decrease in 24-hour total morphine consumption was observed in Group A (11.58±4.100mg) compared Group B (15.46±3.64mg) (*p*=0.040) (Table 4).

Table (4): Mean ± S.D of morphine doses for the two groups.

Group	A	B	<i>p</i> -value
Time to 1 st dose	17.33±7.101	10.46±5.043	0.019
No of doses	1.500±0.522	2.15±0.555	0.009
Total dose	11.58±4.100	15.46±3.643	0.040

Patients of Group A showed a significant decrease in the number of post-operative extra analgesic doses of morphine than Group B (Table 5).

Table (5): Frequency and percent of patients who needed extra analgesic morphine post-operative in the 2 groups (n=28).

Number of doses	A	B
1	6 (50.0%)	1 (7.7%)
2	6 (50.0%)	9 (69.2%)
3	0 (0%)	3 (23.1%)
Total	12(100%)	13(100%)

1: 1 extra dose. 2: 2 extra doses. 3: 3 extra doses.

In Group A 7 patients developed mild sedation, 2 patients developed moderate sedation and 1 patient only developed severe sedation in comparison with Group B where 4 patients developed mild sedation, 5 patients developed moderate sedation and 3 patients developed severe sedation but of no significant value (Table 6).

Table (6): Frequency and percent of patients who developed sedation as a result of post operative morphine in the 2 groups (n=28).

Sedation scale	A (n=14)	B (n=14)
Mild	7 (70.0%)	4 (33.3%)
Moderate	2 (20.0%)	5 (41.7%)
Severe	1 (10.0%)	3 (25%)
Total	10 (100%)	12 (100%)

In Group A 4 patients developed mild nausea, 2 patients developed moderate nausea and 1 patient only developed severe nausea in comparison with Group B where 6 patients developed mild nausea, 4 patients developed moderate nausea and 2 patients developed severe nausea but of no significant value (Table 7).

Table (7): Frequency and percent of patients who developed Nausea as a result of post-operative morphine in the 2 groups (n=28).

Nausea scale	A (n=14)	B (n=14)
Mild	4 (57.1%)	6 (50.0%)
Moderate	2 (28.6%)	4 (33.3%)
Severe	1 (14.3%)	2 (16.7%)
Total	7 (100%)	12 (100%)

There was vomiting of 4 patients in Group A at time of 8-24h post-operatively in comparison to Group B where there were 2 cases of vomiting at time 4-6h post-operative and 4 patients at time of 8-24h post-operatively but of no significant value (Table 8).

Table (8): Frequency and percent of patients who developed vomiting as a result of post-operative morphine in the 2 groups (n=28).

Vomiting scale	A (n=14)	B (n=14)
Time 1	0 (0.0%)	0 (0.0%)
Time 2	0 (0.0%)	0 (0.0%)
Time 3	0 (0.0%)	2 (14.3%)
Time 4	0 (0.0%)	0 (0.0%)
Time 5	4 (28.6%)	4 (28.6%)

Time 1: 0-2 hours post operative.
 Time 2: 2-4 hours post operative.
 Time 3: 4-6 hours post operative.
 Time 4: 6-8 hours post operative.
 Time 5: 8-24 hours post operative.

In Group A there was one patient who developed post-operative respiratory depression as a result of morphine therapy in comparison to Group B where 3 patients developed respiratory depression but of no statistic significance (Table 9).

Table (9): Frequency and percent of patients who developed Respiratory depression as a result of post-operative morphine in the 2 groups (n=28).

Vomiting scale	A (n=14)	B (n=14)
No	13 (92.9%)	11 (78.6%)
Yes	1 (7.1%)	3 (21.4%)
Total	14 (100%)	14 (100%)

Discussion

The abdominal wall is supplied by the lower six thoracic and upper two lumbar sensory nerves, either through extensions of the intercostal branches or, for the more caudal nerves, through the musculature of the abdominal wall. These nerves pass through a number of plexuses and there is therefore a variation in the course of individual nerves from one patient to another. As a result, the use of anatomical knowledge to achieve analgesia after abdominal surgery and the evolution of approaches over time have resulted in a variety of analgesic techniques that are used in current clinical practice [4].

Technological advances, such as real-time ultrasonography, allow more accurate identification of plexuses and peripheral nerves, with a corresponding improvement in block success. As a result, there is a better appreciation of individual anatomy. These advances also allow the anaesthetist to perform blocks more distally, e.g. in the abdom-

inal field. Although regional anaesthesia is not the only change in managing these patients, the introduction of new techniques or new approaches to old techniques has resulted in ever-increasing numbers of patients who receive non-central neuraxial blockade for abdominal surgery, and warrants discussion [9].

There are few data comparing ilioinguinal/Iliohypogastric Nerve (IHN) block with ultrasound-guided TAP block in patients undergoing inguinal hernia repair.

Aveline CH, et al. 2011 [10] made a study to compare US-guided TAP block with IHN block in adult males patients undergoing inguinal hernia repair. They found that pain intensity at rest was lower during the first 24h after an ultrasound-guided TAP block compared with an IHN block. The difference in pain scores was not observed for pain on movement on the first Post-Operative Day (POD) and this could be explained by the duration of the block in both groups that did not extend until 24h [11]. Morphine demand was decreased in patients who benefited from a TAP block, but the difference in morphine consumption between the two groups was not important enough to account for a difference in the incidence of Post-Operative Nausea and Vomiting (PONV). The systematic use of droperidol and non-steroidal anti-inflammatory and the lack of use of N₂O are probably implicated in the absence of a difference in PONV. A more cephalad extension of sensory block with the ultrasound-guided TAP block also probably accounted for the lower postoperative Visual Analogue Score (VAS) and opioid requirements [12]. There was also a trend to an improvement in sleep quality on the first postoperative night in the TAP block group, but the difference was not statistically significant. In the control group, IHN block was performed blindly and it is likely that in some patients, LA solution could have been distributed into the subcutaneous layer or within muscle planes explaining less efficient anaesthesia [13].

In the present study, we compared between ultrasound guided transversus abdominis plane block combined with transversalis fascia plane block Versus ultrasound guided transversus abdominis plane block alone as regards degree of pain relief intraoperatively and post-operatively, and incidence of complications.

In our study, all patients received fentanyl (1-1.5micg/kg to a maximum of 150micg) at induction and before surgical incision and this was like most of other studies on TAP block where all patients

received analgesics prior to skin incision these may be attributable to the reported delayed onset of the block and to the fact that the block does not affect visceral sensation or may be because not all studies performed the TAP block after induction of anesthesia. McDonnell and colleagues (2007) who developed and evaluated the TAP Block, introduced fentanyl 1-1.5µg/kg as well as morphine 0.15mg/kg, rectal diclofenac (1mg/kg) and rectal acetaminophen 1g immediately before surgical incision to all patients in their Randomized Control Trial (RCT) in 2007, in which they investigated the analgesic efficacy of posterior TAP Block after abdominal surgery in adults [3].

In our study by Comparing the 2 pain scores (the V.A.S at rest and at movement) of the two groups immediately postoperative and then at 1, 2, 4, 8, 12 and 24 hours postoperatively revealed that the median VAS scores of Group B (TAP block alone) at rest and at movement were higher than Group A (combined TAP and TFP block) with statistically significant difference in the analgesic effect of the two groups.

At all times, the visual analogue pain score in Group A and Group B show statistically significant differences between the median V.A.S of the two groups except VAS-at rest-8h (time 5) and VAS-at movement-12h (time 6) that show no significant difference between the two groups. This result was consistent with the results of Hebbard PD (2009) who made a study on ultrasound guided TFP combined with TAP for long-lasting analgesia in patients underwent iliac crest bone harvest. Early in the experience, one patient underwent a repeat block due to postoperative pain after iliac crest bone harvest, no detectable block, and a difficult block owing to the depth of imaging. The patient's pain was relieved by the second block. The other 16 patients had a detectable block to ice over the iliac crest; with excellent analgesia. There have been no complications. Compared with the more anteriorly placed ultrasound-guided posterior TAP injection, the block is limited in the anterior abdomen, as only L1, T12, and possibly T11 will be blocked. However, T12 and L1 supply laterally over the iliac crest as far as the greater trochanter enabling a simple and effective analgesic block over the iliac crest, upper lateral thigh, and lower abdomen. Also, the TFP is continuous medially with the plane of the lumbar plexus, and opening the plane with fluid may provide an alternative lateral approach to lumbar plexus block under ultrasound-guidance [14]. Aveline CH, et al. (2011) found that Median VAS pain scores at rest were lower in the ultrasound-guided TAP group at 4h

(11 vs 15.), at 12h (20 vs 30), and at 24h (29 vs 33). Then they assessed pain after 3 and 6 months from surgery surgery. The proportion of patients with VAS on movement at 6 months was comparable {18.2% [95% CI (12.2-26.1%)] vs 22.4% (15.8-30.6%) in the TAP and IHN groups, respectively} this result may be due to the blind technique used for II/IH nerve blocks as the positions of the nerves vary widely between the patients or there may be due to loss of some local anaesthetics between muscle layers or in subcutaneous tissue [10].

In our study a significant decrease in 24-hour total morphine consumption was observed in the combined TAP and TFP (Group 1) (11.58±4.100mg) compared with the TAP alone (Group 2) (15.46±3.64mg) ($p<0.040$). The time to first request for morphine was significantly prolonged in Group 1 than in Group 2 ($p<0.019$). The subsequent doses of morphine were required at significantly longer time intervals in the Group 1 than in the Group 2 ($p<0.009$).

This result was consistent with the results of Oriola F, et al. 2007. In their prospective, randomized, double-blind study, they compared the combination of ropivacaine and clonidine (block group) given in bilateral Ilioinguinal nerve block versus saline (control). Seventy patients were randomized. The total morphine consumption during the first two postoperative days was decreased by 51% in the block group compared with the control group [15].

These results were also consistent with the results of Boztosun A., et al. 2013 who made a randomised, controlled, double-blind study to compare pain relief after caesarean section achieved by an intra-abdominal Iliohypogastric and Ilioinguinal (IH/II) nerve block with levobupivacaine with that in patients given a placebo. Sixty women scheduled for caesarean delivery under general anaesthesia were enrolled in the study. They found that morphine consumption at 12 and 24 hours was significantly lower for both time points in the levobupivacaine group. VAS scores 2, 6 and 12 hours after the operation were also significantly lower in the levobupivacaine group [16].

In our study the incidence of post-operative nausea, vomiting, sedation or respiratory depression as complications of post-operative morphine therapy were less in Group A than in Group B but of no statistic significance. This results are consistent with Aveline C., et al. (2011) that show as in the present study, that the systematic use of anti emetics

and the lack of use of N₂O are probably implicated in the absence of a difference in PONV [10].

There were no complications detected in the two groups. Patients satisfaction were more obvious in Group A than Group B, but of no statistic significance. These results were consistent with the results of Hebbard PD (2009) with no complications and excellent analgesia in the 17 patients who received combined ultrasound guided TFP and TAP [14].

These results were not consistent with the results of Farooq M, et al. (2008) who published a case report describing a complication related to the blind landmark technique for TAP insertion. A posterior TAP block was performed on a woman for abdominal hysterectomy (50kg in weight and 160cm tall). At laparotomy, approximately 50ml of fresh blood was found in the abdomen, due to needle perforation of the liver. The liver was found to be enlarged and reached the right iliac crest. Authors of the report recommend palpation of the liver edge prior to block insertion, especially in people of small stature [17].

The results of our study wasn't in line with the results of Weintraud, et al. (2009) who made a prospectively randomized study on 70 children scheduled for inguinal hernia repair to receive either a landmark based or an Ultrasound guided (US group) Ilioinguinal Nerve Block (INB), in addition to a standardized general anesthesia. The authors made a study that investigated the role of ultrasonographic guidance on absorption of local anesthetics [18]. The authors stated that faster resorption and higher plasma concentrations of ropivacaine when using an ultra-sound guided injection technique compared with a landmark-based technique for ilioinguinal nerve block. A possible explanation was the more abundant vascularization of muscle tissue compared with that of fascial planes and an increased area available for absorption so, was faster absorption and higher plasma levels after the Intramuscular (IM) injection associated with the landmark based technique compared with the intermuscular administration associated with the ultrasound guided approach. Another possible explanation for these findings could be that the close proximity of large vessels (e.g., inferior epigastric artery) relative to the site of LA injection under u/s guidance. The main consequence of these findings is that ultrasonographic-guided INB should be performed with low volumes of LA as described by Willschke, et al. (2005), who made a prospective randomized double-blinded study on 100 children undergoing

inguinal hernia repair and orchidopexy to compare the use of ultrasonography versus the conventional ilioinguinal/iliohypogastric nerve block technique. They used levobupivacaine 0.25% until both nerves seen by u/s were surrounded by the local anaesthetic and the conventional 'fascial click' method using levobupivacaine 0.25% (0.3ml/kg) additional intra- and postoperative analgesic requirements were recorded. They found that during the intraoperative period 4% of the children in the ultrasound group received additional analgesics compared with 26% in the fascial click group ($p=0.004$). And only 6% children in the ultrasound-guided group needed postoperative rectal acetaminophen compared with 40% children in the fascial click group. They stated that ultrasound-guided ilioinguinal/iliohypogastric nerve blocks can be achieved with significantly smaller volumes of local anaesthetics (only 0.075 mL/kgLA) and provided sufficient intra- and post-operative analgesia [12].

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الملخص العربي

يمثل الألم الناتج عن الجرح بالبطن جزء كبير من الألم الناتج جراء العمليات الجراحية في البطن. ويتغذى جدار البطن بأعصاب تمر في الغشاء ما بين العضلة البطنية المستعرضة والعضلة البطنية الداخلية.

ويعتبر التخدير الشامل لجدار البطن قديم نسبياً وكثير الاستخدام، ولكنه بالرغم من ذلك يحتاج لحقن الكثير من المواد المخدرة الموضعية في نقاط كثيرة كما يعتمد على نقاط فقدان الضغط مما يجعل من نجاحها غير قابل للتوقع.

ولذلك يعتبر التخدير الموضعي للبطن عن طريق استخدام نقطة واحدة تقع ما بين العضلة البطنية العرضية والعضلة البطنية الداخلية من خلال المثلث القطني (lumbar triangle of Petit)، سهل نسبياً ويمكن أن يغطي معظم الأعصاب المغذية لجدار البطن.

ان استخدام الموجات الصوتية في عمل التخدير الجزئي، يعتبر حديث نسبياً ولكنه لاقى اهتمام كبير في مجال التخدير. وتعتبر المنافع المرجوة من استخدام الموجات الصوتية في هذا المجال كثيرة فهي سهلة الاستخدام، كما أن نسبة نجاحها عالية وتقلل من كمية المواد المخدرة الموضعية وبالتالي تزيد من الأمان أثناء التخدير.

وتنقسم طرق قياس الألم الى تقرير شخصي، ملاحظة السلوك والتصرف وقياس المؤشرات الحيوية. ويعتبر طرق القياس التي تستخدم أكثر من طريقة كاستخدام المؤشرات الحيوية وملاحظة السلوك، أفضل من استخدام طريقة واحدة.

هذا وينتشر استخدام طرق التخدير وتسكين الألم الموضعي والجزئي في العمليات الجراحية المختلفة. لان التخدير الجزئي يقلل من استخدام المسكنات القوية المخدرة التي تعطى عن طريق الحقن العضلي أو الوريدي أو عن طريق الفم، كما يزيد من رضا المرضى بعد اجراء العمليات الجراحية.

وقد تم ادخال التخدير الموضعي للبطن (TAP block) في معظم المستشفيات التعليمية وغيرها.

وفي الدراسة الحالية، قد تم المقارنة بين استخدام التخدير الموضعي للعضلة البطنية المستعرضة متحداً مع اللفافة المستعرضة للبطن (Combined TAP & TFA block)، والتخدير الموضعي للعضلة البطنية المستعرضة فقط (TAP block alone) لعمل التخدير الموضعي. وقد تم قياس الفارق بين الطريقتين في تخفيف الألم بعد اجراء العمليات الجراحية على البطن. وقد شملت الدراسة مجموعتان هما:

• مجموعة (أ): التخدير الموضعي للعضلة البطنية المستعرضة متحداً مع اللفافة المستعرضة للبطن (Combined TAP & TFA block) وعددها ١٤ مريض.

• مجموعة (ب): التخدير الموضعي للعضلة البطنية المستعرضة فقط (TAP block alone) وعددها ١٤ مريض.

ان جهاز السونار المستخدم هو جهاز ١٠٠٠ CONCEPT الاوروبي مستخدمين المجس المتعدد الترددات.

وقد كان العدد الكلي للمرضى في الدراسة ٢٤ مريض تتراوح أعمارهم ما بين ٤٠-٢٠ سنة وقد تم اجراء عمليات جراحية لهم على البطن في مستشفى قصر العيني. وقد تم اعطاء المرضى المخدر الموضعي بعد المخدر الكلي.

وقد تم التوصل إلى أن استخدام السونار لعمل التخدير الموضعي للعضلة البطنية المستعرضة متحداً مع اللفافة المستعرضة للبطن (Combined TAP & TFA block) يعطى فوائد إضافية للمسكنات المتعددة التي يتم إعطاؤها للمرضى الذين يجرون عمليات جراحية على البطن. وقد احتاج هؤلاء المرضى في المجموعة الاولى مسكنات أقل أثناء وبعد العملية مقارنة بالمرضى في المجموعة الثانية الذين تم إعطائهم التخدير الموضعي للعضلة البطنية المستعرضة فقط (TAP block alone).

وكان هناك فارقا إحصائياً ملحوظاً بين المجموعتين.

هذا ولم يتم تسجيل أي مضاعفات لهذا التخدير الموضعي للبطن أثناء أو بعد العملية. كما أن نسبة رضا المرضى كانت عالية في المجموعة الأولى أكثر من الثانية.