Aim: The purpose of this trial was to compare ultrasound-guided bilateral transversus abdominis plane (TAP) block with subcutaneous subfacial local anesthetic wound infusion (WI) for analgesia after lower segment cesarean section (CS) performed under general anesthesia (GA).

Patients and Methods: This prospective, double-blind, parallel group, randomized, concealed allocation, controlled, superiority study was performed at Benha University Hospital and El Hayat specialized center Benha, El-Qalubia, Egypt, from October 2014 to September 2015. 240 parturients undergoing CS were randomized in this trial, 112 parturients injected with 20ml bupivacaine 0.25% in either side as TAP block under ultrasound guidance while 110 parturients infused with 30ml subfacially and 10 ml subcutaneously of Bupivacaine 0.25% at the end lower segment CS performed under general anesthesia (GA). Primary outcome was total postcesarean Nalbuphine consumption while the secondary outcomes were pain intensity scores at rest and on movement evaluated by visual analogue scale (VAS) score as well as total non-steroidal anti-inflammatory drug (NSAIDs) consumption, time spent in recovery room (RR), time to first ambulation, deepest level of sedation postoperatively, parturients satisfaction regards postcesarean analgesia at discharge and incidence of nausea, vomiting, Pruritus, analgesic side effects.

Results: 222 parturients were included in final analysis. The average total Nalbuphine consumption was 28.6 ±12.5mg in TAP block group versus 32.8 ± 15.5 in WI group with mean difference of – 3.4 mg at 95% confidence interval (95% CI) of – 0.05 to 6.85, P = 0.07. As regards the secondary outcomes there was no significant difference between TAP block and WI groups in term of postcesarean pain intensity scores both at rest and on movement, time spent in RR, total NSAIDs consumption, time to first ambulation and parturients satisfaction regards postcesarean analgesia. The incidence of nausea, vomiting, pruritus and drug side effects were low in both groups.
Conclusion: Wound infusion and TAP block didn't differ significantly after CS performed under GA in term of postcesarean total Nalbuphine consumption, pain intensity scores at rest and on movement and parturients satisfaction regard postcesarean analgesia

INTRODUCTION

Cesarean section (CS) is the most common world wide operation in the last decade. Postcesarean pain and discomfort is mostly due to incision of abdominal wall as well as muscles dissection, which always delays both breast feeding and early ambulation with subsequent increased in postoperative complications such as venous thromboembolic disorders, postnatal depression, so postcesarean analgesia is of greatest concern for parturients, obstetricians and obstetric anesthesiologists (McDonnell et al., 2009). Opioid remains the most effective analgesia for a wide variety of postoperative pain relief; despite its adverse effects as nausea, vomiting, urinary retention, Pruritus and respiratory depression, (Yu et al., 2002 and Booth et al., 2000) so alternative approaches aiming at a reduction of postcesarean opioid requirement are required.

Several multimodal approaches to control postcesarean pain were tried including local anesthetic wound infiltration either as a single - shot or continuous postoperative wound infusion (McDonnell et al., 2009; Bamigboye & Hofmeyr 2009 and Li et al., 2015) and transversus abdominis plane block (TAP) either ultrasound guide or not (McDonnell & Paech 2012; Sharkey et al., 2013; Mishriky et al., 2012 and Fusco et al., 2015) as well as after general anesthesia (GA) (Elamian et al., 2012) or spinal anesthesia (SP) (Abdallah et al., 2012). Both the wound infiltration (Bamigboye & Hofmeyr 2009 and Li et al., 2015) and TAP block (Mishriky et al., Elamian et al., 2012 and Fusco et al., 2015) were compared to placebo and found to be superior, however there are few trials comparing both approaches in postcesarean pain relief with conflicting results (Aydogmus et al., 2014; Telnes et al., 2015 and Chandon et al., 2014). We aimed in this study to compare ultrasound bilateral TAP block versus subcutaneous subfacial wound infusion with local anesthetic at the end of cesarean section conducted under GA in a prospective randomized, double-blind controlled trial.

PATIENTS AND METHODS

We conducted this prospective, randomized, parallel group, concealed allocation, double-blinded (both parturients and observers), superiority study at Benha University Hospital obstetric and gynecology department and El-Hayat obstetrics and gynecology specialized center, Benha city, Al-Qalubia, Egypt from October 2014 to September 2015. We obtained approval for this trial protocol from Benha Faculty of medicine ethical committee as well as written informed consents from enrolled participants for this study. All parturients scheduled for either elective or emergency (CS) between October 2014 and September 2015 were asked to participate after careful counseling by anesthesiologist (M.H.A). Eligible participants were American Society of Anesthesiologist (ASA) physical status I-II, term pregnancy, undergoing elective or emergency CS under GA, through Pfannenstiel incision, muscle splitting and lower uterine seg-
ment CS. Parturients with history of recent opioid exposure, drug abuse (including opioids and benzodiazepines), psychological disorders, hypersensitivity to any drugs prescribed in this trial, or coagulating disorders and there ages < 18 or > 45 years, weight < 60 kg (dose toxicity), BMI > 35 kg/m² and those with surgical complications during CS, infection at the block injection site and those with significant cardiovascular, renal or hepatic disease and known fetal malformation and those underwent failed instrumental delivery trail were excluded from this trial.

Parturients were sequentially recruited and allocated to TAP block or wound infusion (LAWI) with local anesthetic randomly at 1:1 ratio. A randomized treatment allocation schedule of different block size was created by the study statistician with aids of computer random number generator and stored by the obstetrician (M.A.E). The point of randomization took place when parturients were asked to enter the operation room. Both study participants, as well as outcomes evaluators, were blinded to group assignment. Under standard obstetric GA, including propofol 3mg/kg or thiopental sodium 5mg/kg for induction, succinylcholine 1.5mg/kg for tracheal intubations, atracurium 0.4 mg/kg for muscle relaxant, isoflurane 0.8% as inhalational anesthetic, nalbuphine 0.4 mg/kg for intraoperative analgesia after delivery of the neonate and neostigmine 40 m/kg for muscle relaxant reverse as well as an electrocardiogram (ECG), non-invasive blood pressure, pulse oximetry and capnogram, as basic patients monitoring, parturients were dorsally positioned with left lateral tilt of 15 degree and lower segment cesarean section (LSCS) were performed in usual way through transverse pfannenstial incision with complete colosure of partial penitouium. Before closure of rectus sheath a 14 gauge cannula inserted in upper part away from the incision line passing skin, subcutaneous tissue and anterior rectus sheath so, fluid infused through it will be subfacial after rectus sheath closure and another cannula inserted subcutaneously away from incision line where fluid infused through it will be directly infused into subcutaneous tissue, this is done only in group of parturients assigned to LAWI after closure of skin subcuticular , a total of 40 ml Bupivacain 0.25% were infused, 30 ml in subfacial and 10 ml in subcutaneous after that both cannula removed, while after wound closure in parturinets assigned to TAP block, a trained anesthesiologist (M.H.A) in ultrasound guided TAP block with aids of 4-12 MHZ linear array transducer (Clearview 350, Philips, bothell, WA) inject 20 ml Bupivacain 0.25% on either slide by 20 gauge spinal needle introduced from medial to latternal in plane with ultrasound probe, in the plane between transversus abdominis muscle and deep to internal oblique. To maintain blindness of the two procedure in all parturients, 4 similar small pieces of circular plastic Bandage dress covered 4 points in participants abdominis, two pieces were placed at subcutaneous and subfacial canula sites and two at sites of TAP block, as well as anesthesiologist and obstetrician doing the CS and TAP block was not involved in data collection.

Parturients were evaluated for degree of sedation, hemodynamic and respiratory stability, nausea, vomiting, Pruritus at recovery room (RR). When pa-
Parturients were totally awake and vitally stable, they transferred to the postoperative ward. Parturients in both groups were advised that they could ask for rescue analgesia at any time following the surgery. Intravenous 5ml (5mg) nalbuphine HCL (Nalufin, 20mg/ml, AMON pharmaceutical co. SAE, El obour city, Cairo, Egypt. diluted in 20ml saline) was given if parturients had pain ≥ 40mm on visual analogue scale (VAS) score at rest and tenoxicam (Soral 20mg vial, Global NAPI pharmaceuticals (GNP), Cairo, Egypt) 20 mg if parturients expressing pain on walking, or on coughing ≥ 40mm on VAS score at postoperative word.

The main outcome was total cumulative postcesarean Nalbuphine consumption while the secondary outcomes were severity of postoperative pain both at rest and on movement (coughing, Knee Flexion, Walking) assessed by VAS score of 100mm, where 0 coined for no pain and 100mm indicates the worst pain at RR, 2, 6, 12, 24 hour after C.S, level of sedation measured on 4-point scale where 0 indicates awake and alert, 1 indicates minimally sedated and responds to speech, 2 indicates moderately sedated and respond to tactile simulation, while 3 means deeply sedated and arousable only with painful stimulation, we recorded the deepest level of sedation reached by each parturients during the 24 hour postcesarean period, also we recorded the presence of Nalbuphine releated drobbacks as respiratory depression, Pruritus, nausea, vomiting, delayed imobilization and tenexicam related side effects, presence of nausea, vomiting, ambulation time, hospital stay and parturients satisfaction regards postcesarean analgesia evaluated at discharge with aids of 5 point scale where 5 indicates very satisfied, 4 means satisfied, 3 indicates fair, 2 indicate unsatisfied while 1 means very unsatisfied.

Before beginning this study, we conducted a pilot study, in which we infused Bupivacaine 0.25% 30 ml subfacial and 10 ml subcutaneous as postcesarean analgesia and we found the mean postoperative nalbuphine consumption 32.6 ± 24.7 mg. Assuming type I error = 0.05 and type II error = 0.2 with utilizing the 2-tailed student t-test, 100 parturients were needed in each group to detect a 9.78 mg (30%) difference in average total postoperative Nalbuphine consumptive. We considered this 30% reduction to be a clinically minimal significant effect with TAP block over local anesthetic wound infusion. We calculated a total of 240 parturients were need in this trial to compensate for up to 20% dropout.

Statistical analysis was done by SPSS package (SPSS, Chicago, IL, USA) version 14.5 and was according to per protocol analysis where only parturients whom allocated and whom received all of the trial intervention were finally analyzed. We presented continuous variable as baselines demographic and clinical criteria and average cumulative Nalbuphine, tenoxicam, age, BMI, VAS score in terms of means, standard deviations and ranges, while categorical variabes such as incidence of nausea, vomiting, Pruritus were presented as number and percentages. Significance in between continuous variables was by independent sample Student's t-test and in between categorical variable was by Fisher's exact test. Significance was determined by p values and estimate difference with
95% confidence interval (CI), P < 0.05 was taken as statistically significant.

**RESULTS**

We assessed 300 parturients for eligibility, 240 parturients were eligible and allocated to either local anesthetic wound infusion group (LAWI) or bilateral ultrasound guide TAP block group (TAP), 120 parturients in each group. 18 parturients didn't receive assigned intervention as allocated, 8 in TAP block group and 10 in LAWI group due to the deviation of surgical procedures from the classic way. 112 parturients treated with TAP block and 110 parturients treated with LAWI as assigned, all these 222 parturients were involved in the final analysis (Figure I).

Parturients demographic, clinical and surgical Characteristic did not show any significant difference between both groups as presented in table (1).

Table (2) presents visual analogue scale (VAS) score differences between both groups participants, both at rest and on movement (a cough, Knee Flexion, Walking) and shows that there was no statistically significant difference between both groups at any time points in the postcesarean period.

Table (3) shows that there was no statically significant difference between TAP block or LAWI in postcesarean analgesia trial regards total cumulative nalbuphine consumption, total parenteral non-steroid anti-inflammatory drug in control of postcesarean pain. Also, there was no difference regards ambulation time, time of passing first flatus, recovery room time, length of hospital stay, the incidence of nausea, vomiting, Pruritus, parturients satisfaction with postcesarean analgesia and deepest level of sedation.

We didn't record any apparent complication that could be attributed to ultrasound-guided bilateral TAP block or infiltration of transversus abdominis plane and the subcutaneous subfascial plane with 40 ml Bupivacaine 0.25%.

**DISCUSSION**

The main goal of postcesarean care is to control postcesarean pain, nausea, vomiting as well as promotes early mobilization and enhance breast feeding, this to avoid development of complication as venous thromboembolism breast infection and maternal discomfort (Krivak and Zorn 2007). This objective could be achieved through a multimodal approach (McDonnell et al., 2009). Opioids as patient controlled analgesia and non steroid anti-inflammatory drugs (NSAIDs) with there ability to control dynamic pain postoperatively were the main used postcesarean pain control medication, despite there side effects including nausea, vomiting, pruritus, risk of drug addiction as well as concern regards opioid secretion in milk with subsequent neonatal side effects (Wittels et al., 1990).

This randomized controlled, prospective, double-blind study showed that, then is no significant difference in cumulative nalbuphine consumption (28.6 ± 20.2 vs 32.8 ± 15.5, P = 0.07) and pain intensity (P > 0.05) at 24 hours in parturients underwent GA for CS and receiving TAP block bilaterally under ultrasound-guidance or wound infusion subcutaneous and subfascial of 40 ml 0.25% Bupivacaine as well as pain in-
Fig. (I): Flow diagram in postcesarean analgesia trial recruitment and follow up evaluation of TAP block versus LAWI.

**Abbreviation:** TAP: transversus abdominis plane, LAWI: Local anesthetic wound infusion.
Table (1): Demographic, clinical and surgical criteria of parturients allocated to TAP block or LAWI with 40ml Bupivacaine 0.25% in postcesarean analgesia trial.

<table>
<thead>
<tr>
<th>Variable</th>
<th>TAP (n = 112)</th>
<th>LAWI (n = 110)</th>
<th>Δ 95% CIs</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)*</td>
<td>23.8±5.8</td>
<td>24.2 ± 4.9</td>
<td>-0.4 (-1.02, 1.82)</td>
<td>= 0.51</td>
</tr>
<tr>
<td>BMI (kg/m2)*</td>
<td>30.2±6.8</td>
<td>31.3±5.4</td>
<td>-1.1 (-0.58, 2.78)</td>
<td>= 0.19</td>
</tr>
<tr>
<td>Parity*</td>
<td>1.8±2.6</td>
<td>1.9±0.8</td>
<td>-0.1 (-0.09, 0.29)</td>
<td>= 0.32</td>
</tr>
<tr>
<td><strong>Prior pelvic-abdominal surgery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- None</td>
<td>32 (28.5%)</td>
<td>34 (30.9%)</td>
<td>-2.4% (-9.52, 14.2)</td>
<td>= 0.52</td>
</tr>
<tr>
<td>- CS</td>
<td>60 (53.2%)</td>
<td>54 (49.1%)</td>
<td>4.1% (8.91, 16.92)</td>
<td>= 0.53</td>
</tr>
<tr>
<td>- Other</td>
<td>20 (17.8%)</td>
<td>22 (20.0%)</td>
<td>-2.2 (-8.13, 12.53)</td>
<td>= 0.67</td>
</tr>
<tr>
<td><strong>-Co morbidities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- None</td>
<td>90 (80.4%)</td>
<td>94 (85.4%)</td>
<td>-5% (-5.01, 14.40)</td>
<td>= 0.32</td>
</tr>
<tr>
<td>- HTN</td>
<td>8 (7.2%)</td>
<td>5 (4.5%)</td>
<td>2.7% (-3.93, 4.53)</td>
<td>= 0.39</td>
</tr>
<tr>
<td>- DM</td>
<td>5 (4.4%)</td>
<td>4 (3.6%)</td>
<td>0.8% (-5.09, 6.76)</td>
<td>= 0.76</td>
</tr>
<tr>
<td>- Other</td>
<td>9 (8.0%)</td>
<td>7 (6.5%)</td>
<td>1.5% (5.76, 8.80)</td>
<td>= 0.66</td>
</tr>
<tr>
<td><strong>Type of CS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Primary</td>
<td>39 (34.8%)</td>
<td>35 (31.8%)</td>
<td>3% (-9.30, 15.16)</td>
<td>= 0.63</td>
</tr>
<tr>
<td>- Repeat</td>
<td>73 (65.2%)</td>
<td>75 (68.2%)</td>
<td>-3% (-9.30, 15.16)</td>
<td>= 0.63</td>
</tr>
<tr>
<td><strong>- Gestational age (weeks)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 1</td>
<td>84 (75%)</td>
<td>78 (70.9%)</td>
<td>4.1% (-7.54, 15.62)</td>
<td>= 0.49</td>
</tr>
<tr>
<td>- II</td>
<td>28 (25%)</td>
<td>(29.1%)</td>
<td>-4.1 (-7.54, 19.62)</td>
<td>= 0.49</td>
</tr>
<tr>
<td><strong>- Operative time (min)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Operative blood loss (ml)*</td>
<td>46.8±18.2</td>
<td>51.6±14.2</td>
<td>-4.8 (-0.16, 9.76)</td>
<td>= 0.06</td>
</tr>
<tr>
<td>- Intraoperative intravenous fluid (ml).*</td>
<td>750 ± 250</td>
<td>800 ± 300</td>
<td>-50 (-22.99, 122.99)</td>
<td>= 0.17</td>
</tr>
</tbody>
</table>
| Abbreviation: TAP: transversus abdominis plane, LAWI: Local anesthetic wound infusion, HTN: hypertension, DM: Diabetes mellitus, BMI: Body Mass index, ASA: American society of anesthesiologists physical status, Δ (95% CI): mean or proportion difference with 95% confidence interval. 
- Values were given as mean ± standard deviation* or number (percentage)**
- P < 0.05: Statistically significant.
Table (2): VAS score differences, at rest and on Movement, in postcesarean analgesia trial, between TAP block and LAWI

<table>
<thead>
<tr>
<th>VAS score (0 = non, 100 = worst)</th>
<th>TAP block (n = 112)</th>
<th>LAWI (n = 110)</th>
<th>D95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In RR</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- At rest</td>
<td>34 ± 18 (25-75)</td>
<td>38±19 (28 – 85)</td>
<td>-4 (-0.84 , 8.89)</td>
<td>= 0.10</td>
</tr>
<tr>
<td>- On movement</td>
<td>49±26 (25-90)</td>
<td>52±28 (40-90)</td>
<td>-3 (-4.14, 10.14)</td>
<td>= 0.40</td>
</tr>
<tr>
<td>**At 2h **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- At rest</td>
<td>28±16 (20-10)</td>
<td>32±18 (22 - 78)</td>
<td>-4 (-0.52 , 8.50)</td>
<td>= -0.08</td>
</tr>
<tr>
<td>- On movement</td>
<td>46± 22 (25 - 80)</td>
<td>49±25 (30-85)</td>
<td>-3(-3.22, 9.22)</td>
<td>= 0.34</td>
</tr>
<tr>
<td>**At 6 h **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- At rest</td>
<td>34±19 (25-85)</td>
<td>38±22 (25-80)</td>
<td>-4(-1.43 , 9.43)</td>
<td>= 0.14</td>
</tr>
<tr>
<td>- On movement</td>
<td>47 ± 23 (24-84)</td>
<td>48±25 (30-85)</td>
<td>-1(-5.32, 7.35)</td>
<td>=0.14</td>
</tr>
<tr>
<td><strong>At 12h</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- At rest</td>
<td>26 ± 24 (20-70)</td>
<td>32±24 (20 – 80)</td>
<td>-6 (-0.34, 12.34)</td>
<td>= 0.66</td>
</tr>
<tr>
<td>- On movement</td>
<td>46 ± 25 (25-90)</td>
<td>44 ± 32 (25-90)</td>
<td>2 (-9.58, 5.58)</td>
<td>= 0.60</td>
</tr>
<tr>
<td><strong>At 24 h</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- At rest</td>
<td>24±18 (20-65)</td>
<td>26±16 (22 - 78)</td>
<td>2 (-2.50, 6.50)</td>
<td>= 0.38</td>
</tr>
<tr>
<td>- On movement</td>
<td>38 ± 22 (25-80)</td>
<td>36±21 (30-90)</td>
<td>2(-7.69, 3.69)</td>
<td>= 0.48</td>
</tr>
</tbody>
</table>

**Abbreviation:** VAS: Visual analogue scale, RR: Recovery room, TAP: transversus abdominis plane, LAWI: Local anesthetic wound infusion, Δ (95% CI): mean or proportion percentage difference with 95% confidence interval.
- Values were given as mean ± standard deviation(range)* or number (percentage)**
- P < 0.05 : Statistically significant.
<table>
<thead>
<tr>
<th>Outcomes</th>
<th>TAP block (n = 112)</th>
<th>LAWI (n = 110)</th>
<th>Δ95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total nalbuphin consumption (mg)*</td>
<td>28.6±12.5(20-60)</td>
<td>32.8±15.5(20-60)</td>
<td>-3.4 (-0.05, 6.85)</td>
<td>0.07</td>
</tr>
<tr>
<td>Total parental NSAIDs consumption (mg)*</td>
<td>38.7±20.2(20-80)</td>
<td>42.8±23.5(20-100)</td>
<td>-4.1 (-1.69, 4.89)</td>
<td>0.16</td>
</tr>
<tr>
<td>Ambulation time (h)*</td>
<td>2.6±1.2(2-6)</td>
<td>2.8±1.6(2-6)</td>
<td>-0.2% (0.17, 0.57)</td>
<td>0.24</td>
</tr>
<tr>
<td>RR time (min)*</td>
<td>38.5±15.2 (30–70)</td>
<td>42.6±18.6 (30–80)</td>
<td>-4.1 (-0.36, 8.58)</td>
<td>0.07</td>
</tr>
<tr>
<td>Hospital stay (h)*</td>
<td>22.6±9.6 (18–48)</td>
<td>24.6±8.6 (18–48)</td>
<td>-2 (0.41, 4.41)</td>
<td>0.10</td>
</tr>
<tr>
<td>Time to first flatus (h)*</td>
<td>8.6±3.9 (6–30)</td>
<td>9.6±4.2 (6–30)</td>
<td>-1 (-0.07, 2.07)</td>
<td>0.06</td>
</tr>
<tr>
<td>Nausea**</td>
<td>35 (31.2%)</td>
<td>40 (36.3%)</td>
<td>-5.1% (-4.26, 17.26)</td>
<td>0.42</td>
</tr>
<tr>
<td>Vomiting**</td>
<td>15 (13.3%)</td>
<td>20 (18.8%)</td>
<td>-5.5% (-4.24, 15.23)</td>
<td>0.26</td>
</tr>
<tr>
<td>Pruritus**</td>
<td>8 (7.1%)</td>
<td>12 (10.9%)</td>
<td>-3.8% (-3.98, 11.78)</td>
<td>0.32</td>
</tr>
<tr>
<td>Parturients satisfaction <em>(a)</em></td>
<td>4.2±1.9 (2–5)</td>
<td>3.8±2.3 (2–5)</td>
<td>0.4</td>
<td>0.15</td>
</tr>
<tr>
<td>Deepest level of sedation <em>(b)</em>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>46 (41%)</td>
<td>40 (36.3%)</td>
<td>-4.6% (-8.11, 17.09)</td>
<td>0.48</td>
</tr>
<tr>
<td>1</td>
<td>50 (44.7%)</td>
<td>52 (47.3%)</td>
<td>2.6 (-10.34, 15.43)</td>
<td>0.69</td>
</tr>
<tr>
<td>2</td>
<td>16 (14.3%)</td>
<td>18 (16.3%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviation:** TAP: transversus abdominis plane, LAWI: Local anesthetic wound infusion, NSAIDs: Nonsteroidal anti-inflammatory drug. Δ (95% CI): Mean proportion differences and 95% confidence interval, RR: Recovery room.
- Values were given as mean ± stranded deviations (range)* or as number (percentage)**
- P < 0.05: statistically significant.
(a) Parturients satisfaction scale with postcesarean analgesia (5 = very satisfied, 4 = satisfied, 3 = fair, 2 = unsatisfied, 1 = very unsatisfied).
(b) The deepest level of sedation evaluated by a 4 point scale throughout the usual word postoperative period (0 = awake and alert, 1 = minimally sedated, responds to speech, 2 = Moderately sedated, arousable with tactile stimulation, 3 = deeply sedated, arousable only by painful stimulation). No parturients in both groups have a level of sedation more than 2.
Intensity at rest and on movement, deepest sedation level, parturients satisfaction with postcesarean analgesia and analgesic drug side effects.

The TAP block postcesarean analgesia were evaluated after GA (Eslamian et al., 2012) as well as after spinal anesthesia (Mishriky et al., 2012; Fusco et al., 2015; Abdallah et al., 2012 and McKeen et al., 2014) either against placebo (Mishriky et al., 2012; Fusco et al., 2015; Eslamian et al., 2012; Abdallah et al., 2012; and McKeen et al., 2014) or local wound infusion with local anesthesia (Aydogmus et al., 2014; Telnes et al., 2015 and Chandon et al., 2014), also the wound infiltration postcesarean analgesia were assessed against placebo (Bamigboye & Hofmeyr 2009 and Li et al., 2015) either as single shot (Bamigboye & Hofmeyr 2009 and Li et al., 2015) or continuous infusion, either only subcutaneously (Trotter et al., 1991) or/and subfacially including peritoneum (Bamigboye & Justus 2008).

TAP block was found effective against placebo under GA as regards cumulative tramadol consumption as well as pain intensity at 24 hours (Eslamian et al., 2012). We choose to evaluate postcesarean analgesia after GA as in our country, there is a great fear of needle insertion in the back as well as a choice of nalbuphine as it is the most common opioid available for analgesia as morphine is prohibited for postcesarean analgesia in our University Hospital. TAP block was found effective in term of postcesarean analgesia in partuients underwent spinal anesthesia when compared to placebo only when intrathecal morphine is not used (Mishriky et al., 2012; Fusco et al., 2015; Abdallah et al., 2012 and Bamigboye & Justus 2008). Also, local anesthetic wound infiltration in different forms found to be effective in term of postcesarean analgesia (Bamigboye & Hofmeyr 2009; Li et al., 2015; Trotter et al., 1991; Ranta et al., 2006; Reinikainen et al., 2014; Jolly et al., 2015; Bamigboye & Justus 2008 and Kainu et al., 2012).

TAP block and wound infiltrative trials for post operative analgesia were analyzed systemically by Yu et al., (2014) and Guo et al., (2015) Yu et al., (2014) analyzed four trials performed on adults had various lower abdominis surgery, and they concluded that TAP block had significant reduction in pain intensity at 24 hours despite that there were no difference regards pain intensity at 2,4 hours postcesarean, morphine consumption at 24 hours as well as nausea, vomiting incidence. While Guo et al., (2015) analyzed nine trials including different group of patients, including children, adults, parturients undergoing various lower abdominal operation, including both open and laparoscopic surgery as CS, hysterectomy and they concluded that TAP block is better in terms of pain intensity at 8, 24 hours and total morphine consumption. However, there was an insignificant difference in pain intensity after 1 hour, level of sedation, the incidence of vomiting and nause as well as stime of rescue analgesia.

We carefully searching databases as Medline and Embase and we couldn't find trials comparing directly bilateral ultrasound-guided TAP block with subfacial, subcutaneous local anesthetic wound infusion in postcesarean analgesia in partuients undergoing general anesthesia, so we will compare results of this trial we available randomized trials
evaluated TAP block with wound infil-
tration at cesarean section performed
under spinal anesthesia (Aydogmus et
al., 2014; Telnès et al., 2015 and Chan-
don et al., 2014). Aydogmus et al.,
(2014) injecting 40 ml, in bilateral ultra-
sound-guided TAP block or wound infil-
tration (WI) of 0.25% levobupivacaine
and they demonstrated that a significant-
ly reduced pain intensity at 2, 6, 12 hours
and longer time to rescue analgesia with
TAP block over WI, but there was no
difference as regards pain intensity in
movement and parturients satisfaction
regards the postcesarean analgesia. Tel-
nès et al., (2015) adding 5 mg/ml adrena-
line to 40 ml 0.25% Bupivacaine for ei-
ther TAP block or WI and they reported
no significant differences regards pain
intensity at 12, 24, 36, 48 hours as well
as total morphine consumption, nausea
and vomiting incidence, time of first
rescuer analgesia. Chandon et al., 2014
whom prematurely terminated there trial
due to occurrence of generalized con-
vulsions in one parturient in TAP block
group, reported no signification differ-
ence in pain intensity between partur-
ients received TAP block and those re-
ceived continuous wound infusion.

We didn't record, in this study any
complication could be attributed to local
Bupivacaine injection in transversus
abdominis plane or either infused subcu-
taneous or subfascial in wound as rec-
ored with Chandon et al., (2014); Eslam-
ian et al., (2012), and Weiss et al.,
(2014) whom reported systemic convulsion
with TAP block or Naidu et al.,
(2013); Naidu & Rickebe (2013) whom
reported acute fatty liver in postpartum
patient undergoing TAP block with Bu-
pivacaine. Also, in this trial needle-
related injuries with TAP block, as re-
ported with Lancater and Chadwick
(2010), didn't record, as the procedure
done under ultrasonic-guidance by
trained anesthesiologists. In this study
we don't report systemic toxicity related
to local anesthetic as we use 40 ml in
maximal with lower Bupivacaine con-
centration 0.25%, so a total of 100 mg
dose, as reported with Eslamion et al.,
(2011), whom used 30 ml of 0.25% Bu-
pivacaine effectively for bilateral TAP
block.

This trial had many strength points
including double blinding of both partu-
rients and caregivers, blinding after ran-
donization were maintained as partici-
pants enrollment and baseline recording
was done by single trained obstetrician
not included in further steps of study
conduct as well as general anesthesia
administration and local anesthetic prep-
paration was done by trained anesthesiolo-
gist not involved in futher study steps
and SHAM application of four plastic
bandage circular pieces at all four possi-
ble sites of TAP blocks and LAWI sites,
so parturients and assessors couldn't
know to whom trail arm the parturients
related. While blinding of obstetrician
performing local wound infusion as well
as anesthesiologist performing TAP
block was considered unethical accord-
ing to Benha Faculty of medicine ethical
committee Board as this necessitating
injection of saline in surgical wound or
transverses abdominis plane. Also, we
considered doing this trial in parturients
underwent general anesthesia a strength
point as this is important to our commu-
}

While the limitation of this trial
could be didn't including a placebo con-
tral groups. However, prior trials com-
paring the effectiveness of both procedures and elucidated their effectiveness in comparison to placebo. We utilize total Nalbuphine consumption as a primary outcome, as nalbuphine is the only allowed and available opioid for postcesarean analgesia in our University Hospital and private center, also cumulative nalbuphine consumption as represent to the efficiency of postcesarean analgesia doesn't subject to experience and tendency of outcomes evaluator as pain degree which is more subjective.

CONCLUSION

This prospective, doubled - blind randomized controlled parallel group trial demonstrated that both ultrasound-guided bilateral TAP block and subfacial, subcutaneous wound infusion with 40 mL Bupivacaine 0.25% performed in parturients underwent cesarean section under general anesthesia didn't differ significantly in term of cumulative postcesarean Nalbuphine consumption, postcesarean pain intensity at rest and on movement as well as parturients satisfaction with postcesarean analgesia. So we recommended doing local wound infusion subfacial and subcutaneous over ultrasound-guided TAP block as it is easy and needs no more requirements and without possible needle-related complications as TAP block.

ACKNOWLEDGMENT

The authors were thankful to their colleges, fellows, parturients, data collectors and caregiver who were helping them in completing this trial.

REFERENCES


7. Chandon, M.; Bonnet, A.; Burg, Y.;


---

**Postcesarean Analgesia**

---

Egypt. J. Med. Sci. 36 (2) 2015


دراسة إكلينيكية معمّمة محكمة عن تأثير حقن عقار البيبوفاكين في الجرح تحت الجلد وحدها وقائمة وحقنها في مجال العضلة البطنية العرضية بمساعدة الموجات فوق الصوتية للتحكم في الألم ما بعد القيصرية المخدرة، تخديرًا كليًا

محمد أبوالنور - محمد حامد عبد الرحمن

من قسم أمراض النساء والتوليد 1 - قسم التحذير والعناية المركزية الجراحية

كلية الطب جامعة بني سويف

الأهداف: هدف هذه الدراسة هو المقارنة بين حقن عقار البيبوفاكين في الجرح لوحدها وحقنها في مجال العضلة البطنية العرضية بمساعدة الموجات فوق الصوتية للتحكم في الألم الناجم عن إجراء الجراحة القيصرية.

طرق ووسائل البحث: هذه الدراسة الإكلينيكية السريرية المعتمدة المحكمة أجريت في كلية طب بني سويف قسم النساء والتوليد ومركز الحياة التخصصي في الفترة ما بين أكتوبر 2014 وسентيرماب 2015 على 240 حالة ولادة قيصرية، 112 حالة قيصرية تم حقن عقار البيبوفاكين 0.5% بما في مجال العضلة البطنية العرضية 20 سم في حالة كل ناحة وفي 110 حالة ولادة قيصرية تم حقن البيبوفاكين في الجرح 10 سم تحت الجلد و 30 سم تحت اللثافة وتتم متابعة الحالات بعد ذلك من حيث درجة شدة الألم مكاسة بقياس الألم المشاهد على الوجه وكذلك معدل استخدام المخدر التالوفيون بعد العملية وكذلك قياس معدل استخدام السكينات الأخرى وقسط رضاء السيدات عن الإحساس بالألم وكذلك معدل الأثار الجانبية من استخدام الأدوية المسكنة.

النتائج: شمل التحليل النهائى 242 حالة ولادة قيصرية. وكان معدل استخدام التالوفيون 28.2 ± 15.6 ملغ/جام مع حقن المخدر في مجال العضلات وكان في حالة حيث المخدر تحت الجلد 21.8 ± 15.6 ملغ/جام ولا يوجد فرق إحصائي بين الجدولين، وكذلك لم تجد الدراسة أي فرق إحصائي بين الظروف من حيث شدة الألم في غرفة الرعاية المركزية بعد العمليات وكذلك معدل الأثار الجانبية الناتجة عن استخدام الأدوية.
المسكنة وكذلك نسبة رضاء الولادات قيصرية عن علاج الألم بعد التبصرة المخدرة تخديرًا كليًا.

التوصيات: نظرًا لأنه لم يوجد اختلاف بين الطريقتين المستخدمتين لعلاج الألم بعد التبصرة المخدرة تخديرًا كليًا، ينصح بإجراء الحقن المخدر تحت الجلد وتحت الثاقبة حيث أنها طريقة سهلة ولا تحتاج أدوات كثيرة للتغلب على الألم الناتج عن الجراحة التبصرية المخدرة تخديرًا كليًا.

63. المجلة المصرية للعلوم الطبية 33 (2) ديسمبر 2015: 115-116-117