



Ultrasound–Guided Transversus Abdominis Plane (USG-TAP) Block for Post-Cesarean Section Pain Control

Thesis

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Abstract

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). 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.

Aim of the Work: To study the analgesic effect of the ultrasound-guided transversus abdominis plane (USG-TAP) block as regard the pain score in the post-operative period (24 hours) in patients undergoing cesarean section.

Patients and Methods

Methodology: Type of the study: This study was a prospective randomized controlled clinical trial performed on women undergoing cesarean section. In the current study, fifty women undergoing cesarean section were recruited, 25 cases received the ultrasound-guided TAP block and the other 25 controls received placebo in the form of TAP saline. Both groups were observed post-operatively to assess the pain scores during rest and movement at 3, 6, 9, 12 and 24 hours and also to observe for any side effects or complications.

Results: The current study included 50 women undergoing cesarean section. The patients were randomized in 2 groups using computerized randomization system: Group 1: subjects who received ultrasound-guided TAP block using bupivacaine (cases 25). Group 2: subjects who received ultrasound-guided TAP placebo injection (control group 25).

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.

Recommendations: As proved to be effective especially during the early post-operative period, the ultrasound guided TAP block can be offered to all women after cesarean section.

Keywords: Ultrasound-Guided, Abdominis Plane, Post-Cesarean Section

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢



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List of Abbreviations

ACOG	:	American College of Obstetricians and Gynecologists
BMI	:	Body mass index
CI	:	Confidence interval
CM	:	Costal margin
CS	:	Cesarean section
CNS	:	Central nervous system
COX	:	Cyclo-oxygenase
CTG	:	Cardiotocography
FHR	:	Fetal heart rate
GABA	:	Gamma amino butyric acid
HIV	:	Human immune deficiency virus
IC	:	Iliac crest
IASP	:	International association for the study of pain
LMWH	:	Low molecular weight heparin
MPQ	:	McGill Pain Questionnaire
NICE	:	National Institute for Health and Care Excellence
NRS	:	Numerical Rating Scale
NSAID	:	Non-steroidal anti-inflammatory drug
PCA	:	Patient controlled analgesia
PONV	:	Post-operative nausea and vomiting
SD	:	Standard deviation
TAP	:	Transversus abdominis plane
USG	:	Ultrasound guided
VAS	:	Visual analogue scale
VRS	:	Verbal rating scale
WHO	:	World Health Organization

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Introduction

Cesarean section is one of the most commonly performed surgical procedures. It is estimated that 15% of births worldwide and 21.1% of those in the developed world occur by cesarean section (**Gibbons et al., 2012**).

Women undergoing cesarean section are worried about intra - and postoperative pain. Good analgesia with minimal side effects is desirable if early mobility, bonding with the infant and prevention of chronic pain are to be achieved (**Patel et al., 2012**).

Pain may also impair the ability of the mother to ambulate, placing her at an increased risk for thromboembolic events, a significant cause of maternal morbidity and mortality. In the long term, inappropriately treated postoperative pain may lead to the development of chronic pain, the incidence of which has been reported to be as high as 12% at 10 months after CS (**Eisenach et al., 2008 & Nikolajsen et al., 2004**).

Post-cesarean section pain and discomfort may be anticipated due to skin incision, uterine incision and uterine contraction (**Baaj et al., 2010**).

A multimodal analgesic technique is known to result in an improved quality of postoperative analgesia after CS. The usual multimodal techniques consist of a combination of opioids (either systemic or neuraxial), nonsteroidal anti-inflammatory agents, and acetaminophen. Despite these treatments, acute breakthrough and chronic pain remain a significant clinical problem (**Costello et al., 2009**).

The optimum form of postoperative analgesia is not known, but many procedures are carried out under spinal anesthesia and patients typically receive spinal, systemic or both opioids as components of multimodal analgesia in the

postoperative period. However, opioids, whether given via the spinal or systemic route, are frequently associated with adverse effects such as nausea, pruritus, sedation, and occasionally respiratory depression (**Madadi et al., 2009**).

It has been recommended recently that patients should be monitored extensively to detect respiratory depression after receiving hydrophilic opioids via the spinal route. Thus, knowledge about alternative (non-opioid) analgesia is important (**McMorrow et al., 2011**).

Subarachnoid morphine is highly effective for the management of postoperative pain after cesarean delivery (**Yu N et al., 2014**). However, its use is associated with undesirable adverse effects, particularly nausea, vomiting, and pruritus, which reduce overall patient satisfaction. More serious is the risk of delayed maternal respiratory depression due to rostral spread of morphine (**Caravallo et al., 2008**).

The transversus abdominis plane (TAP) block is a regional analgesic technique which blocks T6-L1 nerve branches and has an evolving role in postoperative analgesia for lower abdominal surgeries (**Marhofer et al., 2010**). It is a simple and safe technique and is a potential alternative to spinal opioid for analgesia after cesarean section, whether guided by traditional anatomic landmarks or by ultrasound (**Belavy et al., 2009**).

In the context of multimodal analgesia with diclofenac and acetaminophen, the use of morphine provides effective analgesia for a median (range) duration of 20 (6-33) hours as opposed to a shorter time, 220 (150-380) minutes, with the TAP block (**Belavy et al., 2009**). In addition, subarachnoid morphine may effectively treat both somatic pain from the abdominal wall arising from the wound and visceral pain arising from the uterus, whereas the TAP block covers only

the pain derived from the abdominal wall incision (**Kanazi et al., 2010**).

Recent evidence suggests that the addition of the transversus abdominis plane (TAP) block to a multimodal analgesic technique, not including a long-acting intrathecal opioid, significantly reduces opioid requirements after CS (**McDonnell et al., 2007**). The TAP block has also been shown to be useful for patients undergoing midline laparotomies under general anesthesia, where intravenous morphine requirements were significantly reduced (**Carney et al., 2008**).

The TAP block is a relatively novel regional anesthetic technique, which has been shown to reduce intravenous morphine requirements in women after CS and in general surgical patients after laparotomy (**Costello et al., 2009**).

Aim of the work

To study the analgesic effect of the ultrasound-guided transversus abdominis plane (USG-TAP) block as regard the pain score in the post-operative period (24 hours) in women undergoing cesarean section.

Research hypothesis:

In women undergoing caesarean section the ultrasound-guided transversus abdominis plane (USG-TAP) block may relief pain in the 24 hours postoperative period.

Research question:

In women undergoing caesarean section, Does the ultrasound-guided transversus abdominis plane (USG-TAP) block relief pain in the 24 hours postoperative period?

Medical applications:

- Postoperative analgesia especially after cesarean section to increase patient satisfaction regarding pain control.
- Use of ultrasound-guided TAP block in conjunction with conventional analgesics to improve overall patient pain relief.
- Limitation of the use of opioid analgesics.

Patients and Methods

This study will be a prospective randomized controlled trial performed on women undergoing cesarean section at Ain Shams University Maternity Hospital from July 2016 to December 2016.

All recruited women will give an informed written and signed consent to participate in the study and will be instructed as regard the visual analogue scale (VAS) for postoperative pain measurement.

Inclusion criteria:

- Women undergoing cesarean section under spinal anesthesia.

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.