

# Extraperitoneal Cesarean, is it Safe and Comfortable?

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## ABSTRACT

We aimed to show that extraperitoneal cesarean delivery (EPCD) is more advantageous than trans peritoneal cesarean delivery (TPCD).

Sixty cases analyzed either EPCD or TPCD were included in this study. Patients with suspected placental invasion anomalies (placenta accreta, increta or percreta), placenta previa, a history of midline uterine incision, multiple pregnancies, previous cesarean section, previous major abdominal surgery, delivery before 34 weeks of gestation or fetal macrosomia (estimated fetal weight >4500 g) were excluded. The endpoints were the duration of the operation, nausea and vomiting during the operation, postoperative nausea and vomiting, the number of analgesic medications, postoperative shoulder pain, postoperative gas/stool discharge time, complete blood count (CBC), urinary dysfunction, and neonatal outcomes.

### Results

TPCD patients suffered significantly more intraoperative nausea (10% vs. 33.3%, p:0.03) and postoperative vomiting (0% vs. 13.3%, p: 0.04) compared to TPCD group. There was no significant difference in intraoperative vomiting and postoperative nausea rates between the two groups (p:0.282). The duration of the operation was shorter in TPCD than EPCD groups (25,5 minutes vs. 28,7 minutes, p=0.01). After the operation, significantly fewer analgesic drugs were used in the EPCD than the TPCD groups (p: 0.01). The duration between defecation and operation was significantly shorter in the EPCD group compared to TPCD group (p: 0,042). Postoperative shoulder pain and flatulating time were similar between the two groups. There was no significant difference in urinary symptoms after six weeks of the operation between the two groups (p:0,690). No significant difference was found for neonatal outcomes between each groups.

EPCD reduces postoperative pain, analgesic requirement, nausea, vomiting, and bowel dysfunction in cesarean patients without an increase in significant complications.

**Key Words:** Extraperitoneal cesarean, postoperative pain, surgical advantages

## Introduction

Cesarean deliveries account for 1 in 3 of total births in the US (1). The rate of this common operation is on an increasing trend worldwide (2,3). Various complications and pain can be seen after a cesarean surgery, and this leads obstetricians to look for alternative surgical methods.

The standard surgical method of the cesarean section is the modified Misgav Ladach surgical technique (4). In this technique, after passing the subcutaneous and fascia layers, the surgeon accesses the abdomen via dissecting the peritoneal layer bluntly or sharply. It was defined as trans peritoneal cesarean delivery (TPCD). Lower segment transverse incisions are preferred due to less pain, better cosmetic results, and less hernia through the skin incision (5-7). Extraperitoneal cesarean delivery (EPCD) is another option for accessing to the abdomen. In the pre-antibiotic period, this technique was more frequently used in

order to reduce the risk of intraperitoneal infection. However, it is rarely performed nowadays due to the low number of obstetricians familiar to this technique (8). In the literature, some studies have shown that EPCD is associated with less nausea, vomiting, surgical area pain, shoulder pain, less analgesic use, and shorter recovery (9-14). Postoperative pain scores and postoperative complication rates may be higher in terms of the history of repeated surgery (15). Furthermore, numerous studies showed that the need for analgesia in the postoperative period differed between nulliparous and multiparous women (16). A limitation of the previous studies is the samples which also include multiparous patients or patients with cesarean history. For those reasons, studies preferentially including nulliparous and elective cesarean patients are needed.

We aimed to compare intraoperative and postoperative complications associated with EPCD and TPCD in this study.

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## Material and Methods

This case-control study was conducted between January and October 2018. Sixty cases performed either EPCD or TPCD were included in this retrospective analysis (thirty cases each). Patients with suspected placental invasion anomalies (placenta accreta, increta or percreta), placenta previa, a history of midline uterine incision, multiple pregnancies, previous cesarean section, previous major abdominal surgery, delivery before 34 weeks of gestation or fetal macrosomia (estimated fetal weight >4500 g) were excluded. Spinal anesthesia was applied to all cases. Entire operations were performed by a single operator (OK). Mobilization was achieved whenever possible. Postoperative 2nd-hour liquid and postoperative 6th-hour solid food intake were encouraged. Diclofenac intramuscular and/or paracetamol oral/intravenous were used for analgesia. The endpoints were the duration of the operation, nausea and vomiting during the operation, postoperative nausea and vomiting, the number of analgesic medications, postoperative shoulder pain, postoperative gas/stool discharge time, complete blood count (CBC), urinary dysfunction, and neonatal outcomes. Complete blood count (CBC) values were recorded on the day of the operation and on the first day after the surgery. Urogenital complaints were documented at sixth week after the operation. Urogenital distress was determined using Urogenital Distress Inventory (UDI) (17-18). The UDI reflects three aspects of urogenital dysfunction: obstructive discomfort, stress symptoms and irritative symptoms. Neonatal outcomes were defined as the APGAR scores and birth weight. The duration of the operation was defined starting from the time of the skin incision to the skin closure.

A urinary catheter was placed before the operation. 2 g Cefazolin was given intravenously before the incision. The method of the extraperitoneal procedure was based on the literature (19-21).

In the EPCD, Pfannenstiel incision was performed, and subcutaneous tissues were explored via blunt or sharp dissections. Rectus fascia was then incised in a curvilinear fashion. The preperitoneal area was dissected, and the bladder was eliminated. Following this, blunt dissection to the deperitonealised area between the uterus and the bladder was performed, and the lower segment of the uterus was incised. The baby was borned, and the placenta was taken as performed in the TPCD. The uterus was sutured

with absorbable sutures. Fascia and skin incision was closed consecutively as in the classical Pfannenstiel method. TPCD was performed with the traditional method.

All analyses were performed using the SPSS 24 for Windows (SPSS Inc., Chicago, IL, USA). Data were expressed by means and standard deviations, median and range or number and percentages where appropriate. Categorical data were assessed using the chi-square test or Fisher's exact test. Independent samples t-test or Mann-Whitney U test were used for comparison of numerical variables. Alfa was set to 0.05.

## Results

A total of 60 patients were recruited for the present study. Demographic characteristics and indications for cesarean section were not different between the two groups (Table 1). TPCD patients suffered significantly more intraoperative nausea (10% vs. 33.3%,  $p:0.03$ ) and postoperative vomiting (0% vs. 13.3%,  $p: 0.04$ ) compared to TPCD group. There was no significant difference in intraoperative vomiting and postoperative nausea rates between the two groups ( $p: 0,282$ ). CBC values were similar in the two groups on the day of the operation and on the first day after the surgery.

The duration of the operation was shorter in TPCD than EPCD groups (25,5 minutes vs. 28,7 minutes,  $p=0.01$ ). After the operation, significantly fewer analgesic drugs were used in the EPCD than the TPCD groups ( $p: 0.01$ ).

The duration between defecation and operation was significantly shorter in the EPCD group compared to TPCD group ( $p: 0,042$ ). Postoperative shoulder pain and flatulating time were similar between the two groups. There was no significant difference in urinary symptoms after six weeks of the operation between the two groups ( $p:0,690$ ). No significant difference between the EPCD and TPCD patients were found in terms of birthweights and APGAR scores. Maternal and neonatal outcomes of the aforementioned two groups were demonstrated in Table 2.

## Discussion

Although different cesarean techniques are described in literature, access to the abdomen is performed by opening the peritoneum except the EPCD techniques (22). Less peritoneal irritation occurs when no meconium, amnion, blood or varnish contaminates the abdomen. Therefore less nausea, vomiting, and postoperative pain are expected in this technique.

**Table 1.** Clinical and Demographic Features of Patients

Variable	EPCD n:30 Mean±SD or (%)	IPCD n:30 Mean±SD or (%)	P value
Age	24,83 ± 3,38	25,17 ± 3,39	0.651
BMI	26,57 ± 3,08	26,3 ± 2,79	0.783
Gestational age at delivery	37,47 ± 1,59	37,07 ± 1,68	0.384
Cesarean Indication			0.897
Breech presentation	9 (%30)	10 (%33,3)	
CPD	6 (%20)	6 (%20)	
Failure of labor	6 (%20)	4 (%13,3)	
GHT	4 (%13,3)	5 (%16,7)	
Fetal Anomalies	5 (%16,7)	5 (%16,7)	

BMI= Body mass index, CPD= Cephalopelvic disproportion, GHT= Gestational hypertension

**Table 2.** Maternal and Neonatal Outcomes of Patients

	TPCD n:30 Mean±SD, n(%) or Median (Range)	EPCD n:30 Mean±SD, n(%) or Median (Range)	P value
Intraoperative nausea	10 (% 33,3)	3 (%10)	0.030
Intraoperative vomiting	5 (% 16,7)	1 (%3,3)	0.088
Postoperative nausea	6 (% 20)	3 (% 10)	0.282
Postoperative vomiting	4 (% 13,3)	0 (% 0)	0.040
Shoulder pain	10 (% 33,3)	8 (% 26,7)	0.576
Preoperative Hemoglobin	11,95 ± 1,45	11,74 ± 1,26	0.530
Postoperative Hemoglobin	10,72 ± 1,04	10,44 ± 1,41	0.351
Preoperative Platelet	227133 ± 72381	233700 ± 73668	0.773
Postoperative Platelet	204300 ± 70966	206333 ± 67934	0.906
Preoperative White Blood Cells	10,790 ± 1,640	10,547 ± 1,928	0.620
Postoperative White Blood Cells	14,100 ± 2,540	14,523 ± 3,342	0.723
Apgar 1. Minute	8 (6-9)	8 (5-9)	0.403
Apgar 5. Minute	9 (7-10)	9 (7-10)	0.414
Flatulation time (min.)	14,8 ± 4,4	14,9 ± 5,04	0.870
Defecation time (min.)	19,83 ± 4,2	22,87 ± 5,8	0.042
Operation time (min.)	25,5 ± 4,3	28,27 ± 3,6	0.010
Birthweight (grams)	3214 ± 370	3201 ± 347	0.953
Uriner seymtoms	4 (% 13,3)	3 (% 10)	0.690
Analgesics	2,97 ± 0,718	2,27 ± 0,691	0.001
Postoperative Shoulder pain	10 (%33,3)	8 (%26,7)	0.576

Compatible with the literature, we observed less intraoperative nausea, postoperative vomiting, and less analgesic requirement in the postoperative period in the EPCD group. Previous studies are in accordance with those findings (13,14). Defecation occurred significantly earlier in the EPCD cases compared to controls. Since intestinal irritation is less in the EPCD technique, earlier bowel movements and less bowel dysfunction are expected. Another explanation of more rapid bowel

movements may be earlier mobilization due to less postoperative pain in the EPCD group. Unlike previous studies, the operation time in the TPCD technique was shorter (13,14). We can attribute this result to the surgeon operating who is more familiar to the TPCD technique. As EPCD experience increases over time, the duration of operation may decrease. In the EPCD technique, potentially more urinary dysfunction is expected due to the dissection of the paravesical area.

Still, the rates of urinary dysfunction in both groups were similar in our study. Although more complications are expected in the EPCD technique due to organ neighborhood, in our study, no complications were observed in any groups. A case was reported with cervical abscess and the vaginal fistula in the EPCD technique (23).

EPCD was the preferred technique in the pre-antibiotic period due to the advantages on less infection in the abdomen. Previous studies showed that less fever was observed in the postoperative period with this technique (24). The importance of that condition decreased due to the frequent administration of antibiotics nowadays.

Cesarean operation differs from other surgeries in term of the patient behavior, as mother intends to care for the newborn immediately after surgery. Enhanced recovery after surgery (ERAS) is a multidisciplinary approach in order to improve the surgical patients' care, from the preoperative planning phase through the surgery and postoperative period. Surgery is a common physiological stressor, and this approach optimize care for accelerating normal functioning (25). The fundamentals of ERAS approach are multimodal analgesia, minimum opioid analgesia use, early nutrition, and early mobilization. Due to the positive effects, EPCD may facilitate the implementation of the ERAS protocol.

The results of this study should be considered in light of some limitations as the retrospective design, limited number of patients, and the lack of any pain scale. The strengths of this study are the inclusion of only primiparous and elective cesarean cases, and the standardization of all operations by a single surgeon. It is speculated that to repair the uterine lacerations that occur during the procedure, to perform the compression sutures in case of atony, and arterial ligation would be more difficult in the EPCD technique. The challenge of the EPCD in recurrent cesareans, the effects of long-term adhesions, and postoperative infections on fertility are unknown aspects regarding this technique.

Our study indicates that less pain, analgesic requirement, nausea, vomiting, and bowel dysfunction are observed in the EPCD group compared to TPCD patients. Randomized prospective studies, including greater number of patients, are required to assess the long-term outcomes and complications.

Competing interests: The authors declare that they have no competing interest

Ethical approval: This study was conducted in compliance with the ethical principles according to the Declaration of Helsinki.

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