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The outcomes of extending uterine incision transversely or cephalocaudally in patients with previous cesarean section: a prospective randomized controlled study

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Abstract

Objective: The comparison of intraoperative and postoperative outcomes of extending uterine incision transversely or cephalocaudally in patients with previous cesarean section.

Methods: In our prospective randomized controlled study, we divided patients who undergone cesarean section in our hospital due to repeated cesarean indication between July 2014 and June 2015 into two groups according to the cephalocaudal or transverse extension of uterine incision. We recorded the demographic characteristics and intraoperative and postoperative data of all patients included in the study. We assessed the differences between cephalocaudal and transverse extensions of uterine incision as well as statistical data obtained.

Results: We did not found any statistically significant difference between the groups in terms of bleeding volume, transfusion need, uterine artery damage, bladder damage, and atony development. We found that the incision extension was significantly low in those with cephalocaudally extended Kerr incision compared to the transverse group ($p<0.05$). Accordingly, we found that additional suture need was significantly lower ($p<0.05$).

Conclusion: Extension on incision line and additional suture need are higher in the group with transversely extended uterine incision.

Keywords: Cesarean section, uterine incision, cephalocaudal, transverse.

Özet: Geçirilmiş sezaryeni olan hastalarda uterus insizyonunun transvers veya sefalokaudal genişletilmesinin sonuçları: Prospektif randomize kontrollü çalışma

Amaç: Daha önce sezaryen operasyonu geçirmiş hastalarda sezaryen sırasında uterusa uygulanan insizyonunun transvers veya sefalokaudal yönde genişletilmesinin intraoperatif ve postoperatif sonuçlarının karşılaştırılması.

Yöntem: Prospektif randomize kontrollü çalışmamızda, hastanemizde Temmuz 2014 – Haziran 2015 tarihleri arasında, tekrarlayan sezaryen endikasyonuyla sezaryen yapılan hastalar uterus insizyonunun sefalokaudal veya transvers olarak genişletilmesine göre iki gruba ayrıldı. Çalışmaya dahil edilen tüm hastaların demografik özellikleri, intraoperatif ve postoperatif verileri kaydedildi. Elde edilen istatistik verileri ile birlikte uterus insizyonunun sefalokaudal veya transvers genişletilmesi arasındaki farklılıklar değerlendirildi.

Bulgular: Her iki grup arasında kanama miktarı, transfüzyon ihtiyacı, uterin arter hasarı, mesane hasarı, atoni gelişmesi açısından istatistiksel açıdan anlamlı fark saptamadık. Kerr insizyonu sefalokaudal genişletilenlerde transvers gruba göre insizyon hattında uzamayı anlamlı oranda düşük bulduk ($p<0.05$). Bu duruma bağlı olarak ek sütür gereksinimini anlamlı olarak daha az saptadık ($p<0.05$).

Sonuç: Uterus insizyonu transvers genişletilen grupta insizyon hattında uzama ve ek sütür gereksinimini daha fazladır.

Anahtar sözcükler: Sezaryen, uterin insizyon, sefalokaudal, transvers.

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Introduction

Cesarean section is the most frequent surgical procedure performed on fertile women.[1,2] Compared to vaginal delivery, maternal morbidity and mortality risks are higher.[3] With the increase in the rates of delivery by cesarean section, the rates of uterine rupture, scar pregnancy, placental insertion anomalies and hospitalization period also have increased.[4] The severity of these complications necessitated to evaluate cesarean techniques and to investigate the most appropriate method where maternal and fetal well-being are preserved.

The lower segment transverse cesarean section was first defined by Kerr in 1926.[5] The cesarean section is a procedure involving skin incision, access to the abdomen, uterine incision, delivery of baby, closing uterine, closing abdomen and skin saturation. There are various techniques applied during these steps.[6]

In our study, we compared the intraoperative and postoperative outcomes of transverse and cephalocaudal extension of Kerr incision applied to uterine during cesarean section in patients with previous cesarean section. Our purpose was to investigate cesarean technique which will cause less bleeding and injury.

Methods

Our study was a prospective randomized controlled study performed on patients who undergone cesarean section in our hospital due to repeated cesarean indications between July 2014 and June 2015. The approval of ethics committee was obtained from our hospital with the document no. KAEK/2014/6/6. All patients included in the study were informed about the procedure and the informed consent forms were obtained. Cases with placenta previa, cases with placental abruption, patients with coagulation disorder, pregnant women at less than 34 weeks of gestation, delivery cases with anomalies, multiple pregnancies and primary cesarean cases were excluded from the study.

Before the procedure, the technique to be used for extending Kerr incision during cesarean section was determined with a simple randomization. The decision for performing general or regional anesthesia was made by anesthesia team.

After Pfannenstiel incision, subcutaneous tissues were opened bluntly from medial to lateral. The fascia was opened through a transverse incision by scalpel and extended laterally.

The parietal peritoneum was opened bluntly. When necessary, vesical flap was produced. Uterine incision was opened for 1–2 cm with scalpel at lower segment on midline and the cavity was opened bluntly by entering with finger tip. Then, in the transverse extension group, the incision was extended by index finger upwards from medial and towards lateral. In the cephalocaudal group, the incision was bluntly extended from midline to cephalocaudal direction with index and middle fingers of the operator. After the delivery of fetus, it was ensured that placenta was separated spontaneously. Afterwards, the cavity was checked. The uterine was closed continuously as a single layer without locking by no. 1 polyglactin (vicryl). After abdominal cleaning, the fascia was closed continuously without locking by no. 1 polyglactin. The skin was intracutaneously sutured with 2-0 polyglactin (rapid-vicryl).

Maternal demographic characteristics, anesthesia type and intraoperative details were recorded. Hospitalization indications, numbers and types of previous deliveries, maternal age, maternal height and weight, week of gestation and the presence of any unknown disease in mother and baby were recorded for all patients included in the study. Hemogram, blood type analysis, coagulation test and full urinalysis were requested from all patients before the cesarean section. Patients who needed additional suture during uterine incision were noted. After the delivery of fetus, 30 units of oxytocin in 1000 cc normal saline were applied as to be consumed in 30 minutes in order to prevent atony. Those with additional uterotonic needs were noted. Intraoperative bladder damage, opening T incision, presence of uterine artery damage and extended incision findings were noted. Hemoglobin and hematocrit values checked on postoperative day 1 were compared with the initial hemoglobin and hematocrit values. The patients who needed blood transfusion were determined. The extension of incision was defined as the formation of any wall defect in cervix or uterine vertically or towards the inside of uterine vessel group laterally.

The analysis of the data was done by SPSS for Windows 16.0 (SPSS Inc., Chicago, IL, USA). Whether the distribution of continuous variables was close to the normal values or not was investigated with Shapiro-Wilk test. Continuous variables were shown with mean ± standard deviation while nominal variations were shown with case number and percentage (%). Student's t test and

Mann-Whitney U test were used to determine the presence of significant difference between the groups in terms mean and medium values, respectively. Nominal variables were evaluated with chi square test. The value $p<0.05$ was considered statistically significant.

Results

A total of 183 patients, who had cesarean section in our hospital due to repeated cesarean indications between July 2014 and June 2015, were included in our study. Cephalocaudal method was applied in 93 patients included in the study and transverse method in 90 patients (**Fig. 1**). The methods were assigned to the patients by computerized randomization.

The cephalocaudal and transverse groups were compared by demographic and clinical data such as age, gravida, parity, week of gestation, weight, height, body mass index, initial systolic and diastolic tension, initial hemoglobin and hematocrit values, systemic disease (thyroid dysfunction, chronic hypertension and diabetes mellitus) and cervical dilation, and no significant difference was observed between two groups in terms of distribution (**Table 1**).

There was no significant difference between two groups in terms of operation periods and intraoperative complications such as uterine artery damage, bladder damage, opening T incision and uterotonic need. Extension in Kerr incision and additional suture need were higher in transverse group than cephalocaudal group (**Table 2**).

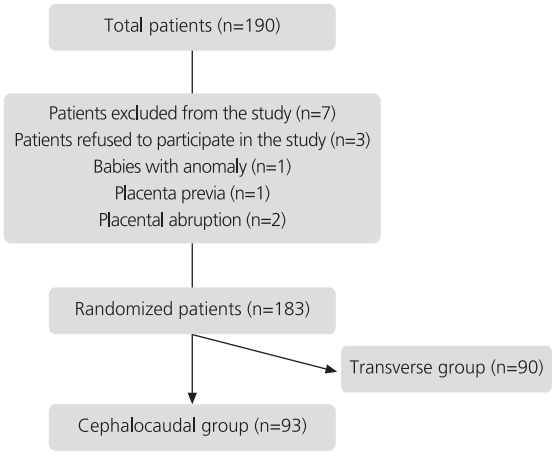

Fig. 1. Distribution of patients participated in the study.

No significant difference was found between cephalocaudal and transverse groups when transfusion need, postoperative hemoglobin and hematocrit values and decreases were compared (**Table 3**).

Table 1. Comparison of the demographic and clinical data of the patients.

	Cephalocaudal (n=93)	Transverse (n=90)	p
Age	29.46±5.69	30.01±5.76	0.518
Gravida	3.1±1.23	3±1.08	0.5
Parity	1.72±0.89	1.62±0.82	0.441
Week of gestation	38.59±1.45	38.48±1.87	0.648
Weight (kg)	75.98±12.56	77.6±14.62	0.422
Height (cm)	159±6.84	159±6.09	0.844
Body mass index (kg/m^2)	30.17±4.62	30.7±5.3	0.475
Initial systolic blood pressure (mmHg)	126±15.92	126±15.71	0.944
Initial diastolic blood pressure (mmHg)	78.23±12.61	78.51±11.04	0.871
Cervical dilation >3 cm	19 (%20.43)	23 (%25.55)	0.410
Patients in active phase	16 (%17.20)	16 (%17.77)	0.918
Systemic disease	21 (%22.58)	19 (%21.11)	0.810
Previous cesarean sections more than one	40 (%43.01)	33 (%36.66)	0.381
Initial hemoglobin (mg/dl)	11.85±1.44	12.16±1.33	0.135
Initial hematocrit (%)	36.1±3.55	37.03±3.52	0.770

Table 2. Comparison of the intraoperative data of the groups.

	Cephalocaudal (n=93)	Transverse (n=90)	p
Fetal birth weight (g)	3287.5±503.13	3269.3±524.51	0.810
Fetal birth weight >4000 g	10 (%10.75)	8 (%8.88)	0.672
Operation duration (minute)	30.26±6.97	32.22±10	0.126
Regional anesthesia	8 (%8.60)	6 (%6.66)	0.622
Extension in Kerr incision	7 (%7.52)	19 (%21.11)	**0.008**
Additional suture need	8 (%8.60)	26 (%28.88)	**<0.001**
Uterine artery damage	2 (%2.15)	4 (%4.44)	0.383
Bladder damage	0	0	1
T incision	1 (%1.07)	3 (%3.33)	0.296
Atony	1 (%1.07)	1 (%1.11)	0.981
Additional uterotonic need	2 (%2.15)	3 (%3.33)	0.623

Table 3. Comparison of the postoperative data of the patients.

	Cephalocaudal (n=93)	Transverse (n=90)	p
Postoperative hemoglobin (mg/dl)	10.6±1.41	10.85±1.57	0.263
Postoperative hematocrit (%)	32.14±3.85	32.74±4.3	0.320
Hemoglobin reduction (mg/dl)	1.26±0.76	1.44±0.86	0.147
Hematocrit reduction (%)	3.4±2.26	4.5±2.47	0.158
Transfusion need	0	2 (%2.22)	0.148

Discussion

Cesarean is the most common major abdominal operation today.[7] Compared to the vaginal delivery, there are more bleeding and complications during cesarean section. Various techniques are applied to reduce these complications.[8,9]

In the studies performed on uterine incision, the risk for uterine artery damage was found high due to the fact that the extension from medial to lateral might be uncontrollably excessive.[6,10] The tissue resistance produced against the cephalocaudal extension of incision up to uterine arteries prevents tissue damage by applying counter-force. Further, it is considered that current tissue resistance prevents uncontrolled extension even in the thinned lower segments. In our study, we found that the uncontrolled extensions that may occur in the lower segment when applying cephalocaudal method were significantly lower than the transverse method. In cephalocaudal extension, additional suture need for hemostasis after closing uterine incision was lower which was statistically significant.

Muscle fibers in the lower segment of uterine lie transversely. Even though Kerr incision is extended towards cephalocaudal direction, the dissection of myometrium occurs according to the anatomy, and therefore undesired extensions towards distal direction are prevented. Similar to our study, Cromi et al. observed in their studies performed in 2008 that undesired extension was more frequent in the transverse group than the cephalocaudal group.[11] Accordingly, transverse group had more additional suture need. If the extension by transverse and blunt technique is performed with index fingers towards lateral direction in an uncontrolled manner, the arterial damage would be inevitable.[12,13] Cephalocaudal extension may prevent this problem by preserving parametrial and uterine arteries.

In our study, we did not find any significant difference between cephalocaudal and transverse groups in terms of bleeding. We excluded cases with placenta previa, multiple pregnancy, coagulation disorders and placental abruption, which might increase bleeding, from the study. We did not observe uterine inversion, uterine rupture, gastrointestinal system damages and urinary system damages in both groups. Unlike Cromi et al., we did not include etiological factors which may increase bleeding in our study.[11] In our study, we did not find any significant difference between transverse group and cephalocaudal group in terms of hemoglobin and hematocrit values, transfusion need and bleeding volume.

Our first condition in our patient groups was the performance of cesarean section with repeated cesarean indication. In previous studies, the cephalocaudal group and transverse group consisted of primary cesarean cases chosen substantially from nulliparous patients. Maybe, the patients with previous scar line on the lower segment of uterine might prevent any significant difference between the two groups in terms of bleeding volume. The lack of significant difference in bleeding volume might be caused by the changes in the vascularization of uterine incision line due to previous scar. However, further studies with wider population are needed to clarify this matter.

One of the most important concerns in cephalocaudal extension is bladder damage. However, we found out that cephalocaudal extension applied to thinned previous scar line due to the pain during the incision of lower segment uterine had no adverse effect causing bladder damage.

In a study performed in 2015 on 112 patients, 55 patients underwent cephalocaudal extension and 57 patients underwent transverse extension. The blood loss and the extension of Kerr incision were evaluated in both groups. The reduction in preoperative and postoperative hemoglobin and hematocrit values and estimated blood loss of the patients were prominently lower in the cephalocaudal group in comparison to the transverse group.[14,15] Unlike other study, they found that uterine artery damage was higher in the transverse group.

Conclusion

In conclusion, the extension of Kerr incision and additional suture needs are higher in patients who undergo cesarean section due to repeated cesarean indications when Kerr incision is extended transversely. Whether cephalopelvic or transverse extension should be preferred for Kerr incision should be decided according to the condition of patient and experience of surgeon.

Conflicts of Interest: No conflicts declared.

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