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Effects of Cervical Dilatation during Cesarean Section on Postpartum Process

 Asiye Uzun

Department of Gynecology and Obstetric, Medipol University, İstanbul, Turkey

ABSTRACT

Objectives: To evaluate the effects of cervical dilatation on postoperative maternal morbidity during a cesarean.

Methods: Pregnant women who applied to Nisa Hospital between 01 June 2019 and 31 August 2019 were included in this study. The cases were compared according to whether cervical dilatation was performed or not. For all cases, evaluation included fever during the postpartum process, preoperative hemoglobin and leukocytes, postoperative 6th-hour hemoglobin and leukocytes, wound infection in postpartum 1st week, postpartum bleeding and postpartum 6th-month scar thickness.

Results: In this study, 95 women were included. There were 48 (50.5%) women in the cervical dilatation group and 47 (49.5%) women in the non-cervical dilatation group. The pre- and postoperative hemogram values of the individuals in both groups were compared. In the cervical dilatation group, hemoglobin was 11.9 (7.7-14.6) g/dL in the preoperative period and 11.4 (7.6-14.5) g/dL in the postoperative period ($p < 0.001$). However, hemoglobin was 11.3 (6.4-13.0) g/dL in the preoperative period and 11.3 (8.3-15.2) g/dL in the postoperative period of the non-cervical dilatation group ($p = 0.459$). Concerning wound infection, fever, bleeding and scar thickness in both groups after birth, only the dilated group was found to be significantly thick in terms of scar thickness in the sixth month ($p < 0.001$).

Conclusion: In our study the mean of difference of hemoglobin and hematocrit values were found to be significantly higher in the cervical dilatation group. Besides this, significant results were found in the dilatation group in terms of long-term scar thickness.

Keywords: Cervix uteri, cicatrix, infections, postpartum period,



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Address for correspondence:

Dr. Asiye Uzun. Department of Gynecology and Obstetric, Medipol University, İstanbul, Turkey

Phone: +90 532 646 41 62

E-mail:

asiye.uzun@nisahastanesi.com

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INTRODUCTION

The most common obstetric surgery of cesarean may be an elective or emergency procedure. Initially used with the aim of saving the mother, over time, it has gained the identity of being a vital operation for the fetus. As a result, it has become one of the most commonly performed surgical operations in the world.^[1] According to World Health Organization data from 2010, the cesarean rates in some countries were the United States of America (30.2%), Italy (37.4%), Switzerland (28.9%) and (27.8%), Germany (27.8%).^[2] The cesarean rates were between 20.7% with 32.9% in the world.^[3, 4] According to the Turkish Population and Health Research for Turkey, the rate was 21.2% (2003), 36.7% (2008) and 40% (2010).^[5] Surgical techniques used for cesarean may vary between centers and individually between gynecologists. In line with this, complications have increased in parallel with the increasing cesarean rates around the world.

It is considered as one of the most important steps in the monitoring of possible complications after cesarean in primary health institutions. The minimum information that should be included in gynecology and obstetrics, especially in the family medicine education program, in 1977, American Academy of Family Physicians American College of Obstetrics and Gynecol-

ogy and Council on Resident Education in Obstetrics and Gynecology was determined by a committee formed.^[6] Accordingly, the family physician should have knowledge and experience about normal pregnancy, delivery and complications. In this context, multidisciplinary working programs in cooperation with family physicians are an approach that is supported worldwide.^[7]

A variety of surgical steps can be taken to minimize these complications. The dominant portion of these steps comprises closure methods for the uterine incision, bladder flap violation, the necessity for visceral peritonization and cervical dilatation.^[8]

Infectious morbidity is listed as one of the most important complications of the cesarean operation. Among strategies to reduce postoperative infection and other morbidities to a minimum after studies about uterine incision closure methods, there are studies about whether cervical dilatation is required or not. Dilatation of the cervix with the index finger, Hegar or Prod dilator during cesarean is performed as a routine step by some gynecologists from the past to the present day. Dilate the closed cervix to prevent the development of hematometra in the first stage in the postoperative process and in this way to minimize postpartum pain and reduce the chance of unwanted bleeding after birth.^[9] In fact, according to general opinion, a closed cervix may not effectively discharge blood remaining after the operation or lochia later on. Sufficient drainage reduces the chance of postoperative hematometra formation, minimizing the endometritis risk. Most importantly, it reduces postpartum hemorrhage rates linked to potential uterine atony development.^[10]

However, from another view point, dilatation of the cervix is thought to allow vaginal flora to progress to the uterus and abdominal cavity and may lay the foundation for endometritis and intraabdominal infection.^[11]

Bollapragada et al. presented two cases in 2002 with elective cesarean and cervical dilatation not performed where hematometra formed and then due to lack of lochia or spontaneous drainage, the patient required dilatation and curettage.^[11] This study led to the formation of a more favorable opinion about intraoperative cervical dilatation.^[12]

This study aims to observe the effects of intraoperative cervical dilatation in primary cesarean patients by comparing postpartum hemoglobin, leukocyte values, wound site infection and postpartum sixth-month scar thickness.

METHOD

The participants who applied to Nisa Hospital between 01 June 2019 and 31 August 2019 were included in this study.

For all cases, evaluation included fever during the postpartum process, preoperative hemoglobin and leukocytes; postoperative 6th hour hemoglobin and leukocytes, wound infection in postpartum 1st week, postpartum bleeding and postpartum 6th month scar thickness.

The cases were compared according to whether cervical dilatation was performed or not. All cases had antepartum age and body mass index (BMI) examined. In the postpartum period, fever, preoperative hemoglobin and leukocytes, hemoglobin and leukocyte in the postoperative sixth hour, wound site infection in hospital and at postpartum 1-week check-up, postpartum hemorrhage and scar thickness in postpartum sixth month were assessed.

Indications for cesarean were determined as malposition of the fetal head, head-pelvis incompatibility, disrupted fetal heart rate, large fetus, anomalies in placenta localization, facial presentation, forehead presentation, and vertex presentation.

All patients had incision site cleaned with povidoneiodine before the operation. A Foley catheter was inserted by the operating room nurse after anesthesia was induced in the operating room and was removed when sufficient diuresis was obtained in the postoperative sixth hour. All patients had prophylactic 2 g cefazolin administered about 30 min preoperative. The same technique was used by the same surgeon to close the uterus and abdominal layers. During the surgery, cervical dilatation was ensured with an index finger in the cervical dilatation group and then gloves were changed.

Cases in both groups were examined during postoperative and ward monitoring for fever every hour until the postoperative sixth hour and every four hours if stable. All patients had hemogram examined preoperatively and in the postoperative sixth hour. Febrile morbidity was defined as fever measured as 38°C or above two or more times in 24 hours after birth. Wound infection was defined as purulent discharge, redness, hardness or sensitivity of the cesarean incision. To observe the long-term efficacy of cervical dilatation, vaginal ultrasound was used to measure myometrial scar thickness in the sixth month in the postpartum period. All patients participating in this study were called using information in hospital records and invited to have sixth month scar thickness examined; however, 24 patients did not accept the invitation.

All assessments were carried out with transvaginal ultrasonography. Measurements were performed by the same gynecologist using the vaginal probe of a LOIQUÉ P5 (Sony, Japan) ultrasound device. Assessments were performed by the transvaginal route with the bladder half-full.

Statistical analyses of data obtained in this study was analyzed using the Statistical Packet for Social Sciences SPSS 25.0 program (SPSS, Chicago, IL, ABD). Frequency, percentage, median, minimum and maximum values were used from the descriptive statistics methods. The distributions of the continuous variables were determined using the Kolmogorov-Smirnov test. Mann-Whitney U test was used to compare continuous variable in abnormal distributions. The Wilcoxon test was used for the comparison of the pre and post operative clinical parameter values of the same participant. Results were considered statistically significant at $p < 0.05$.

RESULTS

In this study, 95 women were included. There were 48 (50.5%) women in the cervical dilatation group and 47 (49.5%) women in the non-cervical dilatation group. The median age was 31.0 (21.0-41.0) years and BMI was 30.0 (20.0-40.0) kg/m² in the cervical dilatation group and the median age was 31.0 (20.0-40.0) years and BMI was 30.0 (29.0-33.0) kg/m² in the non-cervical dilatation group ($p=0.472$; $p=0.828$, respectively).

The pre- and postoperative hemogram values of the individuals in both groups were compared. In the cervical dilatation group, hemoglobin was 11.9 (7.7-14.6) g/dL in the preoperative period and 11.4 (7.6-14.5) g/dL in the postoperative period ($p < 0.001$). However, hemoglobin was 11.3 (6.4-13.0) g/dL in the preoperative period and 11.3 (8.3-15.2) g/dL in the postoperative period of the non-cervical dilatation group, ($p=0.459$). Preoperative and postoperative hemogram values of both groups are summarised in Table 1.

When the differences between the median values of both groups were compared, hemoglobin and hematocrit values were found to be significantly higher in the group without dilatations compared to the group with dilatations

($p=0.005$ and $p=0.049$, respectively). There was no difference found for the leukocyte values between the groups ($p=0.396$). Comparison of the differences between the median values of both groups are summarised in Table 2.

Wound infection was detected in 1 (2.1%) case in both groups ($p=0.747$). Concerning postpartum bleeding, 2 (4.3%) patients in the non-cervical dilatation group had atony detected which responded to medical treatment. There was no significant difference in fever and wound infection ($p=0.988$, $p=0.988$, respectively). Scar thickness median was 8.9 (7.9-9.9) mm in the cervical dilatation group and was 7.5 (5.8-8.6) mm in the noncervical dilatation group ($p < 0.001$). Presence of postpartum scar thickness, fever, wound infection and bleeding in both groups are given in Table 3.

DISCUSSION

Together with the rapid increase in cesarean operation rates around the world, determination of preparatory factors about postoperative short- and long-term clinical outcomes has gained significance. A significant portion of studies on this topic is research about single-layer and dou-

Table 2. Comparison of the differences between the median values of both groups

	Median of difference		p
	Dilatation group (n=48)	Non-dilatation group (n=47)	
Hemoglobin (g/dL)	-0.7 (-3.6-1.5)	-0.1 (-2.3-4.9)	0.005
Hematocrit (%)	-2.0 (-11-4.4)	-1.1 (-7.1-10.9)	0.049
Leukocyte ($\times 10^3/mm^3$)	4.2 (-14.3-18.4)	3.6 (-7.1-10.2)	0.396
Mann-Whitney U test.			
Data were given as median (min-max).			

Table 1. Preoperative and postoperative hemogram values of both groups

	Dilatation group (n=48)		p	Non-dilatation group (n=47)		p
	Preoperative	Postoperative		Preoperative	Postoperative	
Hemoglobin (g/dL)	11.9 (7.7-14.6)	11.4 (7.6-14.5)	<0.001	11.3 (6.4-13.0)	11.3 (8.3-15.2)	0.459
Hematocrit (%)	35.4 (22.5-43.7)	32.4 (22.6-41.2)	<0.001	34.5 (22.3-40.1)	33.7 (26.2-43.1)	0.126
Leukocyte ($\times 10^3/mm^3$)	9.8 (4.6-24.6)	14.1 (8.0-25.9)	<0.001	10.8 (3.4-23.3)	14.7 (9.2-22.1)	<0.001
Wilcoxon test.						
Data were given as median (min-max).						

Table 3. Presence of postpartum scar thickness, fever, wound infection and bleeding in both groups

	Dilatation group (n=48)	Non-dilatation group (n=47)	p
Scar Thickness (mm)	8.9 (7.9-9.9)	7.5 (5.8-8.6)	<0.001*
Having Fever	1 (2.1)	1 (2.1)	0.988†
Wound Site Infection	1 (2.1)	1 (2.1)	0.988†
Bleeding/Atony	0 (0.0)	2 (4.3)	0.310†

*Mann Whitney U test, †Chi-square test.
Data were given as median(min-max) and n (%).

ble-layer closure techniques for the uterus incision, while others are about the necessity for the traditional stage of intraoperative cervical dilatation. Although this is performed routinely, no commonstance has been taken about performing it.^[13, 14]

Among the oldest views about this topic, the study conducted considered opening the cervix with a finger or dilator as a smart step before closing the uterus.^[15] However, the 6th edition of Dewhurst's textbook about postpartum diseases stated that the traditional performance of this method required consideration and attempted to attract attention to the view that advanced studies should be performed.^[14]

Amet et al. did not observe any difference in randomized controlled studies of 131 patients concerning febrile morbidity, endometritis, and estimated bloodloss.^[9] In 2009, Güngördük et al. in a series of 400 patients identified similar rates for febrile morbidity, endometritis, estimated bloodloss and hospital stay between the two groups, with significantly longer operation durations in the dilatation group.^[16] They supported the view that it did not reduce perinatal morbidity and did not appear to be a routine implementation choice.^[16]

Tosun et al. measured endometrial cavity thickness 24 hours after operation in a series of 150 cases in 2011.^[17] In this context, the basic logic for cervical dilatation was to reduce the chance of hematometra developing and the dilated group was identified to have significantly thinner endometrial thickness compared to the undilated group in this sense. However, differences were not identified between the groups concerning febrile morbidity and endometritis.^[18]

At this point, Koifman et al. in a series of 666 patients dilated the cervix with a no 7 Hegar bougie. Available data did not show routine dilatation had any advantage concerning preventing febrile morbidity after elective procedures. In

fact, they included the hypothesis that in the patient subgroup of women with previous vaginal birth, it may lead to an additional risk. When cervical dilatation is performed using cervical dilators, there is nonsterile transfer from the vaginal cavity to the intrauterine cavity and a significant correlation was identified with postoperative fever, especially in the patient subgroup with previous vaginal birth. As a result, they proposed that this procedure not be routinely performed and recommended that it should be a procedure performed when clinically assessed by the surgical team.^[17]

The most recent study was performed in 2017 by Kirscht et al. on 447 patients with cervical dilatation with a Hegar bougie.^[18] Concerning postoperative bloodloss, there was a significant degree of reduction in the cervical dilatation group. In the undilated group, 6.2% of patients required advanced surgical interventions like cervical dilatation, uterotonic applications or postpartum curettage. While the study revealed that cervical dilation is a choice, it emphasized the need for more randomized studies.^[19]

In the literature, the study conducted by Liabsuetrakulet al. with 2227 patients did not find a significant effect of cervical dilatation on postpartum bleeding, with significant difference identified for bloodloss, endometrial cavity thickness, and uterine incision healing. However, there was no difference observed concerning wound infection, urinary tract infection, operation duration, infectious morbidity and integrity of the uterine scar. The study concluded that the currently available information about the advantages of cervical duration as standard during cesarean was insufficient; as a result, evidence supporting the efficacy or safety of cervical dilatation in cesarean was required.^[20]

The results obtained in this study also reveal that cervical dilatation during cesarean section, a common anecdotal practice, is not a necessary intervention. Although there was no difference in the incidence of puerperal fever, endometritis, wound infection between the dilated and non-dilated groups, there was a statistically significant decrease in hemoglobin and hematocrit values in the cervical dilatation group.

When the scar thickness was evaluated in the sixth month, the scar thickness was found significantly higher in the cervical dilatation group. But in a literature scar thickness may affect by other factors like suturing techniques that change healing duration and niche formation.^[21]

In conjunction with the results of recent studies, this study also reveals that routine cervical dilatation during elective cesarean delivery does not necessary in routine practice.

A limitation of the current study was that the differences between the patients with normal vaginal labor history and those who had a primary cesarean section could not be evaluated due to a limited number of cases. Additionally, the study population was not homogeneous with regards to the number of previous cesarean operations.

CONCLUSION

In our study the median of difference of hemoglobin and hematocrit values were found to be significantly higher in the cervical dilatation group. Additionally, significant results were found in the dilatation group in terms of long-term scar thickness. There are insufficient data on dilatation of the cervix to reduce postoperative morbidity during cesarean section so more, randomized controlled studies comparing intraoperative cervical dilatation are needed.

Disclosures

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Ethics Committee Approval: This study was approved by Istanbul Medipol University Ethical Committee of Non-Interventional Clinical Research (Approval number:727 and, Approval date: 30 Nov 2018).

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