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Mechanical dilatation of the cervix transabdominally in elective cesarean section for reducing postpartum endometritis

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SUMMARY

AUTHORS' CONTRIBUTION: (A) Study Design · **(B)** Data Collection . **(C)** Statistical Analysis · **(D)** Data Interpretation · **(E)** Manuscript Preparation · **(F)** Literature Search · **(G)** No Fund Collection

Aim: This study aims to assess the effect of transabdominal cervical dilatation during elective CS in decreasing the incidence of postpartum endometritis.

Patients and methods: It was a randomized controlled clinical trial conducted at the labor ward of the Ain-Shams University Maternity Hospital, in the period from August 2020 to February 2021. The study was include 220 patients who are consenting to be recruited in the study and fulfilling the inclusion criteria. If any of the patients refused to continue in the study or any major complication occur which makes the patient not fit in this study as she didn't meet the inclusion criteria, this patient was considered as a drop out which is included in sample size calculation. The patients will be divided into 2 groups, Group (A) (N=110): CS with mechanical cervical dilatation and Group (B) (N=110): CS without cervical dilatation.

Results: There was no statistically significant between both groups regarding postpartum endometritis or wound sepsis. There was no statistically significant difference between both groups regarding hemoglobin drop or postoperative hospital stay. None of patients in both groups developed cervical injury during transabdominal cervical dilatation during elective CS. There was no statistically significance difference between both groups regarding transabdominal mechanical dilatation of cervix during elective CS and cervical injury during dilatation.

Conclusion: Dilatation of the cervix during cesarean section compared with no dilatation of the cervix did not influence the risk of postpartum endometritis, wound infection, drop between preoperative and postoperative hemoglobin and postoperative hospital stay.

Keywords: Mechanical dilatation of the cervix; Elective cesarean section; Postpartum endometritis

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INTRODUCTION

Cesarean delivery is one of the most common surgical procedures performed by obstetricians. Infectious morbidity after cesarean delivery can have a tremendous impact on the postpartum woman's return to normal function. Despite the widespread use of prophylactic antibiotics, postoperative infectious morbidity still complicates cesarean deliveries [1].

Inflammation of the lining of the womb (endometritis) can be caused by vaginal bacteria entering the womb (uterus) during childbirth and causing infection within six weeks of the birth (postpartum endometritis). Endometritis causes fever, tenderness in the pelvic region and unpleasant-smelling vaginal discharge after the birth. It can have serious complications such as the formation of pelvic abscesses, blood clots, infection of the thin layer of tissue that covers the inside of the abdomen and abdominal organs (peritonitis), and whole body inflammation (sepsis) [2].

Infectious morbidity is the most frequent complication of cesarean delivery. Of women who have cesareans, 5–24% has clinically significant fevers; and 6–21% is diagnosed with uterine infections (endomyometritis or endometritis). Endometritis refers to infection or inflammation of the endometrium, the inner lining of the uterus. The term "endomyometritis" is sometimes used to specify inflammation of the endometrium and the myometrium, 1–5% with more extensive pelvic infections including abscesses and 2–9% with breakdown of the surgical incision [3].

Post-cesarean endometritis and infectious morbidity are due to the presence of bacteria in the vagina and cervix that move higher in the genital tract to infect the uterus. These bacteria have been shown to be responsible for failure of antibiotic prophylaxis during cesarean deliveries [4].

Strategies to minimize postoperative infections and other morbidities have included modifications of surgical technique, changing of gloves intraoperative, methods of placental delivery and altering the uterine position during repair of the uterine incision. However, none of these studies have evaluated the dilatation of the cervix during elective Cesarean Sections (C.S.) [5].

The practice of routine cervical dilatation at elective CS is performed by some surgeons to facilitate discharge of lochia from a uterus that was not in labor in the immediate post -operative period [6].

A mechanical dilatation of the cervix at CS is defined

as an artificial dilatation of the cervix performed by finger, sponge forceps or other instruments in elective caesarean section. An important concern when dilating the cervix in a non -labor uterus is the theoretical risk of ascending infection to the uterus from the vagina [7].

In addition, cervical dilatation may be associated with the creation of a false passage or hemorrhage from cervical injury. However, an undilated cervix may prevent discharge of lochia following elective CS with retention of lochia, a potential culture medium for bacteria, which can cause puerperal genital tract infection [8].

This study aims to assess the effect of transabdominal cervical dilatation during elective CS in decreasing the incidence of postpartum endometritis.

PATIENTS AND METHODS

A randomized controlled clinical trial was carried at the labor ward of the Ain-Shams University Maternity Hospital, in the period from August 2020 to February 2021. 220 patients met all inclusion and exclusion criteria and were included in the study.

The patients were divided into 2 groups:

- Group (A) (N=110): CS with mechanical cervical dilatation.
- Group (B) (N=110): CS without cervical dilatation.

Study Population: (N=220)

Inclusion criteria:

- Age group (20–35 years old).
- BMI between (20–30 kg/m^2).
- Elective Cs (primary or repeated CS).
- Single, viable, term pregnancy, expected fetal weight (2.5 –3.5kg).

Exclusion criteria:

Medical or obstetric conditions that could put the patient at risk for uterine atony, postpartum hemorrhage or infection, such as:

- Anemia (Hb level ≤ 10 gm %) [9].
- Abruptio placenta and Placental site abnormalities eg: Placenta Previa (Placenta accreta, Placenta Increta, Placenta Percreta) [9].
- Emergency Cesarean section.
- Over distended uterus eg: multiple gestation, polyhydramnios, fetal macrosomia (>4.5kg) [10].
- Intra Uterine Fetal Death [11].
- History of Pelvic Inflammatory Disease [12].
- Immune suppressive drugs eg: Corticosteroids [13].
- Autoimmune diseases or immunocompromised disease eg: DM [12].
- Peri-operative blood transfusion or massive blood loss (>3 Liters) [11].
- Rupture of membranes, intra-ammonitic infection and fever during admission (>38^{o}c) [12].
- Previous cervical surgeries eg: Loop electrical excision procedure.

Ethical considerations:

- Informed oral consent explaining the procedure details was obtained from patients prior to inclusion in the study.
- The study was conducted according to the stipulations of the department of Obstetrics & Gynecology, Faculty of Medicine ethical and scientific committee.
- The study was conducted according to the stipulations of the Ain Shams university ethical and scientific committee.
- The privacy of participants and confidentiality of data was guaranteed during the various phases of the study.

STUDY TOOLS AND PROCEDURES

History taking:

- Personal (age, duration of marriage), Present (any current medical or surgical diseases and any current medication), Past history (history of any medical disorders), Obstetric history (including Parity, Gestational age, obstetric complications), Contraception history and Menstrual history.

Clinical examination:

General examination:

1) Assessment of the patients general condition (chronic fatigue eg: in anemic patients)
2) Body Mass Index (BMI) measured in kg/m^2.
3) Color of complexion eg: pallor in anemic patients.
4) Vital data (pulse, blood pressure, temperature).
5) Cardiac and chest auscultation to exclude contraindications for anesthesia.

Abdominal examination: Assessment of fundal level, fetal lie, presentation, liquor volume, fetal heart auscultation and previous scar if present.

Vaginal examination: To exclude cervical changes, rupture of membranes and cervical polyp or fibroids.

Investigations

Ultrasound examination: 2D ultrasound was carried out transabdominally to assess fetal viability, number, determine gestational age exclude any uterine anomalies, fetal anomalies, fetal weight and exact placental location.

Baseline laboratory investigations: Venous blood sample was withdrawn from all participants to assess :

- Hemoglobin level.
- Total leukocyte count.
- Hematocrit value.
- Platelet count.
- RH and blood group.
- Viral markers (HBs Ag, HCV Ab).
- Coagulation profile (PT, PTT, and INR).

All caesarean sections were performed by a senior registrar capable of performing elective cesarean section.

Operative steps:

1) All operations were performed under regional spinal anesthesia.
2) Sterilization of urethral meatus and catheterization under aseptic conditions.
3) Vaginal toilet was done to all patients with povidone iodine solution before the operation.
4) Scrubbing the abdomen was done by using povidone iodine solution 10%.
5) Pfannenstiel incision of the skin was done(Any scar of previous section was removed in both groups) followed by opening of abdominal wall in layers then lower transverse uterine incision and delivery of the baby (without assistance by using forceps) followed by complete delivery of the placenta by controlled cord traction.
6) Oxytocin (5 IU by slow intravenous injection) was used to encourage contraction of the uterus and to decrease blood loss [13].
7) In the cervical dilatation group, the surgeon performed the cervical dilatation (by gently inserting the double-gloved index finger or a straight artery) into the cervical canal of the patients after the extraction of placenta and membranes. The outer glove was removed after this procedure.
8) The uterus was sutured in two layers using vicryl® 1/0 sutures followed by closure of the rectus sheath, closure of the subcutaneous layer (in case its thickness >2cm) with interrupted absorbable sutures [14].
9) The skin was sutured by non-absorbable polypropylene suture 0/2 (subcuticular).
10) Vaginal toilet and Speculum examination was done to exclude any cervical tear.
11) Wound was dressed postoperatively and was changed after 48 hours.

Post-operative care:

1) Postoperative patient care was the same for both groups.
2) All patients received Non-Steroidal Anti-Inflammatory drugs in form of (Diclofenac Sodium®) 75mg IM (one ampule) immediately postoperative then one ampoule 12 hours postoperative [15].
3) Vital signs (pulse, blood pressure, temperature) of the patients were measured four times daily during hospitalization.
4) At 6 h postoperatively, urinary Foley catheters was removed and oral intake with clear fluids was started [16].
5) A venous blood sample for complete blood count examination was withdrawn after 24 hours postoperative.
6) Regular antipyretic was not used so as not to mask possible postpartum pyrexia.
7) Before discharge:
   - Patients were informed about warning symptoms, which raise suspicion for endometritis and were given a contact number to call in case they noticed any of these symptoms.
   - Patients were instructed for postoperative wound care eg: to always keep wound dressing dry and clean and in case it gets wet, it is to be dressed in an aseptic non-touch technique.

Sample size justification:

Based on data obtained from previous studies, possibility of postpartum endometritis in cases without cervical dilatation 9% compared to 0% in cases with cervical dilatation, alpha error 5%, power of study 80%. The required sample size is 220 patients divided into 110 patients in each group. The program for sample size calculation is Stata 15.

Statistical methods:

Categorical data were compared using the chi-square test or Fisher Exact test and the Student t-test or Mann–Whitney U test for continuous data. The results of these analyses were presented as adjusted least square means (standard error of the mean). Statistical analyses were performed using SPSS 20.0 (IBM Corp., Armonk, NY) and SAS 9.3 (SAS Institute Inc., Cary, NC), with $p < 0.05$ considered as statistically significant.

Randomization:

The included patients were randomized using sealed opaque envelope method into two groups each including 110 patients.

To ensure that every patient fulfilling the inclusion criteria had the same chance of participating, in this study randomization was guided by a table of random numbers by a computer based program (using www.randomization.com).

Allocation and concealment:

Patients participating in the study were randomized by a computer generated randomization sheet using MedCalc version 13. Two hundred and twenty opaque envelopes were numbered serially and in each envelope, the corresponding letter, which donates the allocated group, was put according to randomization table. Then all envelopes were closed and put in one box. When the first patient arrives, the first envelope was opened and the patient will be allocated according to the letter inside and so on.

Elimination of bias:

- Laboratory samples were done in the same laboratory preoperative and postoperative.
- Same type of surgical sutures were used to all patients.
- All C.S were performed by a senior registrar.
- All patients received the same kind of antibiotics.
- Urinary catheter was removed after 6 hours postoperative to decrease risk of UTI.
- Speculum examination of cervix after vaginal toilet to exclude any tear.

Data management and analysis:

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science (SPSS 20). Data was presented and suitable analysis was done according to the type of data obtained for each parameter.

i. Descriptive statistics:

1. Mean Standard deviation (± SD) and range for numerical data.
2. Frequency and percentage of non-numerical data.

ii. Analytical statistics:

1. Student T Test was used to assess the statistical significance of the difference between two study group means.
2. Chi-Square test was used to examine the relationship between two qualitative variables.

Fisher's exact test: was used to examine the relationship between two qualitative variables when the expected count is less than 5 in more than 20% of cells.

RESULTS

This study was conducted at Ain Shams University Maternity Hospital during the period between August 2020 and March 2021. 220 pregnant women having elective CS were enrolled in this study randomly allocated in two groups:

Group A (N=110 patient) CS with mechanical cervical dilatation

Group B (N=110 patient) CS without mechanical cervical dilatation

And results were as **Tab. 1.** shows parity and previous history of CS among group A and group B. There was no statistically significant difference between both groups regarding parity and previous history of CS. **Tab. 2.** and **Fig. 1.** shows comparison between both groups regarding gestational age. There was no statistically significant difference between both groups regarding gestational age. **Tab. 3.** shows the comparison between both groups regarding fever, abdominal pain and offensive vaginal discharge which indicate postpartum endometritis diagnosis. There was no statistically significant between both groups regarding developing postpartum endometritis.

Tab. 4. shows the comparison between both groups regarding wound sepsis. There was no statistically significant between both groups regarding wound sepsis. Six patients in group A (with cervical dilatation) developed wound sepsis. Four patients in the form of seroma, three

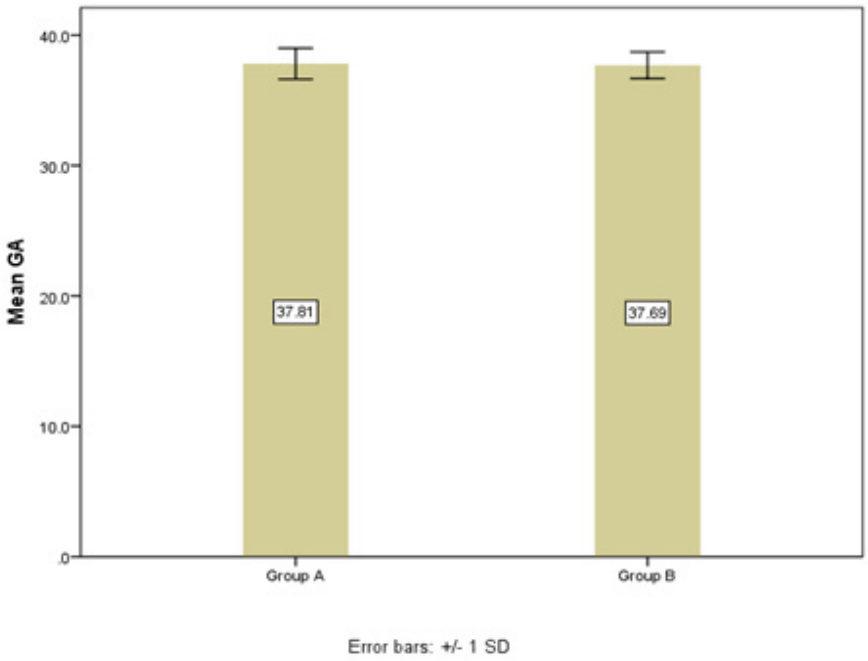
Tab. 1. Parity and previous history of CS among group A and group B.

		Group A With cervical dilatation		Group B Without cervical dilatation		Chi square test		
		N	%	N	%	X^2	p value	sig.
Parity	PG	20	18.2%	12	11.0%	0.5	0.472	NS
	1	18	16.4%	30	27.5%			
	2	35	31.8%	26	23.9%			
	3	20	18.2%	23	21.1%			
	4	13	11.8%	9	8.3%			
	5	4	3.6%	8	7.3%			
	6	0	0.0%	1	0.9%			
CS History	No	16	14.55%	19	17.3%	0.57	0.455	NS
	Yes	94	85.45%	91	82.7%			

Tab. 2. Comparison between both groups regarding gestational age.

	Group A With cervical dilatation		Group B Without cervical dilatation		t test		
	Mean	SD	Mean	SD	t	p value	sig.
GA	37.81	1.19	37.69	1.02	0.810	0.419	NS

Fig. 1. Comparison between both groups regarding gestational age.



Tab. 3. Comparison between both groups regarding fever, abdominal pain and offensive vaginal discharge which indicates postpartum endometritis diagnosis.

		Group A With cervical dilatation		Group B Without cervical dilatation		Fisher exact	
		N	%	N	%	p value	sig.
Fever	No	109	99.1%	109	99.1%	1	NS
	Yes	1	0.9%	1	0.9%		
Abdominal pain	No	109	99.1%	109	99.1%	1	NS
	Yes	1	0.9%	1	0.9%		
Offensive vaginal discharge	No	109	99.1%	109	99.1%	1	NS
	Yes	1	0.9%	1	0.9%		
Endometritis	No	109	99.1%	109	99.1%	1	NS
	Yes	1	0.9%	1	0.9%		

Tab. 4. Comparison between both groups regarding wound sepsis.

Cesarean wound infection	Group A		Group B		Chi square test.	
	N	%	N	%	P-value	sig.
Present	6	5.5	4	3.6	0.785	NS
Absent	104	94.5	106	96.4		

of them were small and eventually resolved spontaneous with no need for further intervention and one large seroma that required external drainage using syringe needle. One patients developed wound cellulitis that resolved with repeated dressing using topical antibiotic (bivatracin). One patient suffered from wound dehiscence that was treated by repeated dressing followed by secondary sutures.

Tab. 5. and **Fig. 2.** shows the comparison between both groups regarding drop in haemoglobin. There was no statistically significant difference between both groups regarding drop in hemoglobin. **Tab. 6**. and **Fig. 3.** shows the comparison between both groups regarding postoperative hospital stay. There was no statistically significance difference between both groups regarding postoperative hospital stay. **Tab. 7.** shows the comparison between groups regarding cervical injury during dilatation. There was no statistically significance difference between both groups regarding cervical injury during dilatation. None of patients in both groups developed cervical injury during transabdominal cervical dilatation during elective cs.

DISCUSSION

This study is a Randomized controlled clinical trial which was carried at the labor ward of the Ain-Shams University Maternity Hospital, in the period from August 2020 to February 2021. 220 patients met all inclusion and exclusion criteria and were included in the study.

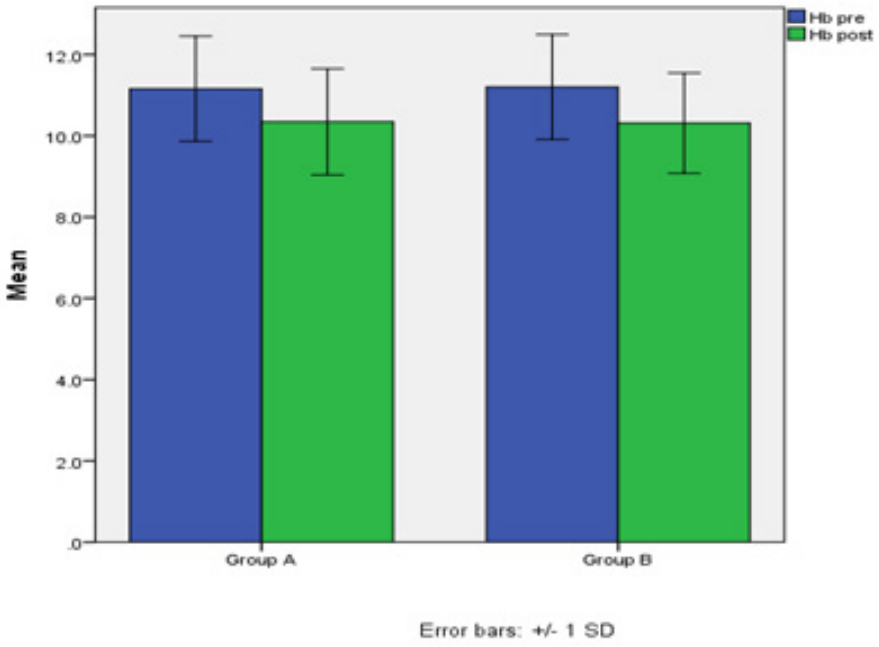
The patients were divided into 2 groups:

- Group (A) (N=110): CS with mechanical cervical dilatation.

Tab. 5. Comparison between both groups regarding drop in hemoglobin.

	Group A With cervical dilatation		Group B Without cervical dilatation		t test		
	Mean	SD	Mean	SD	t	p value	sig.
Hb pre	11.2	1.3	11.2	1.3	-0.247	0.805	NS
Hb post	10.3	1.3	10.3	1.2	0.149	0.882	NS

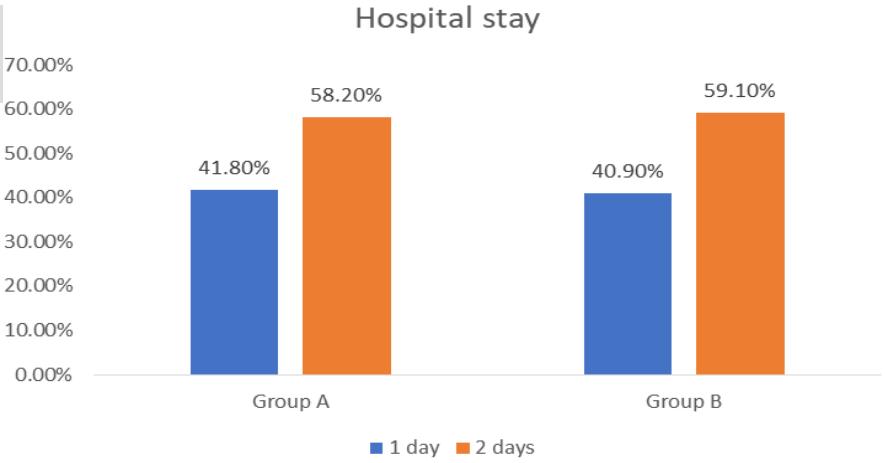
Fig. 2. Comparison between groups regarding drop in hemoglobin.



Tab. 6. Comparison between both groups regarding postoperative hospital stay.

		Group A With cervical dilatation		Group B Without cervical dilatation		Fisher exact	
		N	%	N	%	p value	sig.
Postoperative hos stay	1 day	46	41.8%	45	40.9%	1	NS
	2 days	64	58.2%	65	59.1%		

Fig. 3. Comparison between groups regarding postoperative hospital stay.



Tab. 7. Comparison between groups regarding cervical injury during dilatation.

		Group A With cervical dilatation		Group B Without cervical dilatation		Fisher exact	
		N	%	N	%	p value	sig.
Cervical injury	No	110	100.0%	110	100.0%	-	

- Group (B) (N=110): CS without cervical dilatation.

In this study one patient in group A (with cervical dilatation group) developed postpartum endometritis that was manifested by fever, abdominal pain and offensive vaginal discharge. The diagnosis was confirmed by complete blood picture showing leukocytosis (total leukocyte count = 15.4 × 10^9/L) and blood culture with growth of group B streptococci which resolved with use of cefoxitin (2 g

IV every 6 hours) and clindamycin (300 mg every 8 hours). Parenteral therapy continued until the patient's temperature has remained lower than 37.8 °C (100 °F) for 24 hours, the patient is pain free, and the leukocyte count is normalizing [17].

Another patient in group B (without cervical dilatation) developed postpartum endometritis that was manifested by fever and abdominal pain. The diagnosis was confirmed by complete blood picture showing leukocytosis (total leukocyte count =18.7 × 10^9/L) and blood culture with growth of staphylococcus. Ultrasound revealed pelvic collection of fluid. Exploration was done with drainage of pelvic abscess. Patient improvement was achieved by postoperative administration of Ceftriaxone (1 g IV every 24 hours), Doxycycline (100 mg IV every 12 hours) and Metronidazole (500 mg IV every 12 hours). Parenteral therapy continued until the patient's temperature has remained lower than 37.8 °C (100°F) for 24 hours, the patient is pain free, and the leukocyte count is normalizing [17].

We concluded that there was no statistically significant between both groups regarding developing postpartum endometritis, which agrees with most of previous studies, which studied the effect of mechanical cervical dilatation to reduce risk of developing postpartum endometritis.

Ahmed, et al. conducted a clinical trial to evaluate the effect of routine cervical dilatation during elective CS on maternal morbidity on 131 patients. Of the 131 patients included in the study, 67 underwent cervical dilation and 64 served as controls. There was no significant difference in incidence of fever between the two groups. Only two of the cervical dilation group and one control patient developed postoperative fever. They concluded that intraoperative cervical dilatation during elective cesarean section did not reduce the risk of postoperative maternal fever [8].

Koifman, et al. conducted a retrospective study including 666 patient who underwent elective CS. out of 666 elective CS, 348 underwent routine cervical dilatation. No significant differences were found between the cervical dilatation and the comparison group regarding postpartum febrile morbidity. They concluded that Routine cervical dilatation during elective CS does not reduce post-operative morbidity [18].

Tosun, et al. conducted a randomized trial to investigate the necessity of cervical dilation in elective CS on 150 patients. The two groups were comparable with regard to demographic and clinical properties. Febrile morbidity was seen in one patient in the dilated group. Endometritis was not encountered in either group during the puerperium. They concluded that cervical dilatation seems to be an unnecessary intervention during the cesarean section [19].

Liabsuetrakul, et al. included three trials with a total of 735 women undergoing elective caesarean section. Of these women, 338 underwent intraoperative cervical dilatation with a double-gloved index digit inserted into the cervical canal to dilate, and 397 did not undergo intraoperative cervical dilatation. The incidence of febrile morbidity in the postoperative period in women undergoing intraoperative cervical dilatation was not significantly different from those who did not receive cervical dilatation. There were no significant differences in endometritis and infectious morbidity. They concluded that there was insufficient evidence of mechanical dilatation of the cervix at non-labor caesarean section for reducing postoperative morbidity [4].

Sakinci, et al. enrolled in total 199 patients in his study: 102 in non-dilated group and 97 in cervical dilatation group, which was carried in 2015. Puerperal fever rate was found to be comparable between the groups. In conclusion, he found that intra-operative cervical dilatation does not seem to benefit in terms of puerperal fever [20].

A total of 447 women with elective cesarean section were included in a trial conducted by Kirscht, et al. to assess Dilatation or no dilatation of the cervix during cesarean section regarding postpartum hemorrhage (PPH), Infectious morbidity (puerperal fever, endometritis, wound infection, and urinary tract infection), blood loss (need for blood transfusion or change in hemoglobin levels), and operating time. Cervical dilatation was performed during cesarean section in 205 women (dilatation group) and not performed in 242 (no dilation group). Infectious morbidity, was not diverse between two groups. They concluded that Dilatation of the cervix during cesarean section compared with no dilatation of the cervix did not influence the risk of Infectious morbidity (puerperal fever, endometritis) [7].

Dawood, et al. enrolled 422 women who underwent elective CS in their study to assess the efficacy of mechanical dilatation of cervix transabdominally to decrease postpartum endometritis. There was no significant difference regarding the rate of endometritis in both the groups. The incidence of febrile morbidity was higher in the no cervical dilatation group compared to the cervical dilatation group. Regarding infectious morbidity, they found no significant differences regarding endometritis between the two groups. They speculated that febrile morbidity was higher in the non-dilated cervix group owing to retained blood in the lower uterine segment [21].

The most recent study was performed by Uzun on 95 women, 48 (50.5%) women in the cervical dilatation group and 47 (49.5%) women in the non-cervical dilatation group. Wound infection was detected in one case in both groups. There was no significant difference in fever. They concluded that there are insufficient data on dilatation of the cervix to reduce postoperative morbidity during cesarean section [22].

In our study six patients in group A (with cervical dilatation) developed wound sepsis. Four patients in the form of seroma, three of them were small and eventually resolved spontaneous with no need for further intervention and one large seroma that required external drainage using syringe needle. One patients developed wound cellulitis that resolved with repeated dressing using topical antibiotic (bivatracin). One patient sufferd from wound break down which was treated by repeated dressing followed by secondary suture.

On the other hand, four patients in group B (without cervical dilatation) developed wound sepsis. Three patients in the form of seroma that were small and resolved spontaneous with no need for further intervention. One patient developed wound abscess that was drained surgically.

However, there are many factors (other than infection) may affect wound sepsis eg: Age of Patient, personal hygiene, Chronic Diseases, Poor Nutrition, Lack of Hydration, Poor Blood Circulation, Obesity, Edema and some special habits as smoking.

We concluded that there was no statistically significant between both groups regarding wound sepsis.

Ahmed, et al. study none of the study patients had signs of wound infection. There was no significant difference in incidence of wound infection between the two groups. They concluded that intraoperative cervical dilatation during elective cesarean section did not reduce the risk of wound infection [8].

Koifman, et al. study no significant difference was found between the cervical dilatation and the comparison group regarding wound infection. They concluded that Routine cervical dilatation during elective CS does not reduce post-operative morbidity [18].

Liabsuetrakul, et al. study there were no significant differences in wound infection. They concluded that there was insufficient evidence of mechanical dilatation of the cervix at non-labor caesarean section for reducing postoperative morbidity [4].

Kirscht, et al. study wound sepsis was not diverse between two groups. They concluded that Dilatation of the cervix during cesarean section compared with no dilatation of the cervix did not influence the risk of wound infection [7].

Dawood, et al. study there was no significant difference regarding the rate of wound infection [21].

Uzun A wound infection was detected in one case in both groups. There was no significant difference in wound infection. They concluded that there are insufficient data on dilatation of the cervix to reduce postoperative morbidity during cesarean section [22].

In our study, there was no statistically significant difference between both groups regarding hemoglobin drop between preoperative and postoperative, which agrees with most of previous studies assessed effect of mechanical cervical dilatation and hemoglobin drop between preoperative and postoperative.

Ahmed, et al. study, a hemoglobin drop of more than 0.5 g/dL was noted in 27 and 26 patients in the cervical dilation and the no dilation groups, respectively which were nonsignificant. They concluded that intraoperative cervical dilatation during elective cesarean section did not affect hemoglobin drop between preoperative and postoperative [8].

Tosun, et al. study, the level of hemoglobin reduction was comparable between the groups. There was no statistically significant difference between both groups regarding hemoglobin drop between preoperative and postoperative. They concluded that intraoperative cervical dilatation during elective cesarean section did not affect hemoglobin drop between preoperative and postoperative [19]

Liabsuetrakul, et al. study found that incidence of hemoglobin concentrations in the postoperative period in women undergoing intraoperative cervical dilatation was not significantly different from those who did not receive cervical dilatation. There was no significant difference in change of hemoglobin level, hematocrit level at postoperative period. They concluded that there was insufficient evidence of mechanical dilatation of the cervix at non-labor caesarean section for reducing hemoglobin drop between preoperative and postoperative [4].

Sakinci's study, Change in hemoglobin concentrations was found to be comparable between the groups. In conclusion, he found that intra-operative cervical dilatation does not seem to benefit in term of change in hemoglobin concentrations [20].

Kirscht, et al. in studied dilatation or no dilatation of the cervix during cesarean section regarding blood loss (need for blood transfusion or change in hemoglobin levels). Blood loss was not diverse between two groups. They concluded that Dilatation of the cervix during cesarean section compared with no dilatation of the cervix did not influence the blood loss (need for blood transfusion or change in hemoglobin levels) [7].

However, a study by Uzun did not support our conclusion as he noticed that the differences between the median values of both groups were compared (preoperative and postoperative hemoglobin values of the individuals in both groups) hemoglobin and hematocrit values were found to be significantly higher in the group without dilatations compared to the group with dilatations. They concluded that the median of difference of hemoglobin and hematocrit values were found to be significantly higher in the cervical dilatation group [22].

In our study, there was no reduction in hospital stay in days between dilatation group and non-dilatation group. We concluded that mechanical cervical dilation during elective CS is not associated with reduction of hospital stay in days. However, there are many factors may affect postoperative hospital stay eg: maternal age, parity, weight, general condition, prior obstetrical history, prior medical

history (hypertension, diabetes …. Etc.), bowel motility, pain tolerance, easy ambulation, prior surgical history and breastfeeding.

Sakinci's study did not support our conclusion as he noticed that group with cervical dilatation needed shorter hospital stay than the other group. He concluded that mechanical cervical dilation during elective CS is associated with reduction of postoperative hospital stay in days [20].

Dawood, et al. also did not support our conclusion as he noticed that the duration of hospital stay was significantly higher in the no cervical dilatation group. He concluded that mechanical cervical dilation during elective CS is associated with reduction of postoperative hospital stay in days [21].

In our study, none of patients developed cervical injury during mechanical dilatation of cervix. There was no previous studies assessed the incidence of cervical injury during mechanical cervical dilatation of cervix.

CONCLUSION

Dilatation of the cervix during cesarean section compared with no dilatation of the cervix did not influence the risk of postpartum endometritis, wound infection, drop between preoperative and postoperative hemoglobin and hospital stay in days.

RECOMMENDATIONS

It is recommended that further research is needed using a larger sample size or retrograde follow up of postpartum endometritis patients to see if they underwent transabdominal mechanical dilatation of cervix during their elective CS or not.

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