

Effect of Normal Saline on Cleaning Uterine Cavity During Cesarean Delivery

LOBAT JAFARZADEH¹, HAJAR HOJJATI²

ABSTRACT

Introduction: Cesarean delivery is the most common and costly gynaecologic surgery, with an increase in rate all over the world.

Aim: The present study aimed to estimate the effect of uterine cavity cleansing with normal saline solution during cesarean delivery on the rate of infection, fever, bleeding and postoperative gastrointestinal complications.

Materials and Methods: This study was a clinical trial carried out on 90 pregnant women who underwent elective cesarean delivery. The subjects were randomly assigned into two groups of 45 individuals, including rinsing in 500ml of normal saline solution during cesarean delivery (intervention group) and non-rinsed (control group). Postoperative complications include bleeding, fever, wound infection were examined. The data related to postoperative gastrointestinal complications and endometritis at the second day and one and six weeks after surgery were collected and data were analysed through SPSS 17.

Results: There was no significant difference between two groups regarding febrile morbidity two days after the surgery. The rate of one-week postoperative febrile morbidity was higher in the control group but not statistically significant. The difference in the incidence of fever, wound infection and endometritis on the second day and on the first week was not statistically significant but the incidence of endometritis on the sixth week after surgery was significant in the intervention group than control group and was less in the intervention group, the wound infection at sixth week after surgery was fewer in the intervention group but not statistically significant. There was no significant difference between two groups in terms of gastrointestinal complications.

Conclusion: Uterine cavity cleansing with normal saline solution during cesarean delivery may decrease postoperative complication, although the reduction is not statistically significant.

Keywords: Adult, Cesarean section, Endometritis, Female, Humans, Infection, Surgical wound infection

INTRODUCTION

Rate of cesarean delivery have increased all over the world during the past decades [1,2]. Approximately one-third of the babies born in the U.S were delivered through Cesarean. Cesarean deliveries are often accompanied with postoperative infections. Endometritis, the postpartum uterus infection, can trigger postoperative complications in 6% to 27% of cesarean deliveries [3-5]. To reduce the morbidity, different preventive measures have been taken including the administration of prophylactic antibiotics. Other preventive measures are often conducted concomitantly with the use of prophylactic antibiotics but these are rarely adjusted for reporting the results of studies describing the effect of the prophylactic antibiotics on postoperative infectious morbidity in cesarean delivery. One of these measures is vaginal preparation and the uterine cavity cleaning. In a study done by Haas DM, which showed that vaginal preparation with povidone iodine pre-cesarean delivery may reduce post-surgery morbidities [6]. In another study it was shown that cleansing the vagina immediately before the cesarean delivery with an antiseptic solution (povidone-iodine) reduced the risk of post-cesarean infection of the uterus. This study did not show that vaginal cleansing reduced fever or wound complications after cesarean delivery [5]. Currently, there is no standard care in Iran to prepare the vagina with an antiseptic solution before cesarean delivery. Vaginal cleansing solutions such as povidone iodine have very few side effects in general, with low rates of reported allergies or irritation symptoms [5]. Despite a lack of scientific evidence for efficacy, vaginal preparation and the uterine cavity cleaning are referred to some gynaecologic surgery

textbooks [5]. Very few randomized clinical studies have been published concerning vaginal cleansing before a cesarean delivery with different serums [5,6]. The aim of this study was to determine the impact of uterine cavity cleansing with normal saline solution during cesarean delivery and its impact on the rate of infection, fever, bleeding and postoperative gastrointestinal complications.

MATERIALS AND METHODS

This randomized double blind clinical trial was carried out at public clinical training hospital of Hajar, Shahrekord, Iran from December 2013 to March 2014. Subjects included 90 pregnant women who underwent elective cesarean delivery and had fulfilled the consent form to enter the study. Objective and type of the study and how it will be carried out were explained to all eligible subjects and the consent form was filled by all of them. Exclusion criteria were PROM more than three hours, symptoms of endometritis, fever of any cause (temperature above 38°C), diabetes, abuse of immunosuppressive drugs and bleeding. The patients enrolled for the study were randomly assigned to two groups of 45 individuals, including the rinsed 500ml of normal saline solution during cesarean delivery (intervention group) and non-rinsed (control group). Samples of vaginal discharge cultures for GBS and other pathogens affecting postoperative complications were routinely taken of the patients before cesarean and sent to a laboratory. The sample culture and urine analysis were taken from all patients in a sterile manner. In this study, both groups underwent the same surgery in terms of open abdominal surgery, repair of layers, peritoneum and rectus muscle suturing with same duration and

condition of surgery. For all patients, foley catheter was used during operation. Patient's abdomen was scrubbed with betadine (usual method). Then, abdomen and the uterus was opened and the baby was delivered. After delivery and cord clamping, a dose of one gram of intravenous antibiotics cefazolin was injected to all patients. Corpus luteum placenta and uterus was evacuated spontaneously. The control group did not receive any intervention before the involution of the uterus but in the intervention group, the uterine was thoroughly cleansed by 500-1000 mL of saline [7] and, the additional serum was cleaned from the operating section by suction method. Uterine lining was repaired by chromic suture and in three layers and the abdominal cavity, and paracolic and the posterior vagina was completely scrubbed and became quite clean from clots, vernix and meconium. All layers of the abdominal wall were repaired. Postoperative care were done by obstetrics and gynaecology residents and supervised by the researcher. Temperature was measured by mouth (orally) every 6 hours and high fever (oral temperature greater than 38°C) was evaluated every 6 hours for 24 hours after operation. After discharge, patients were not given antibiotics. All of the Patients were examined in terms of the probability of mastitis, vein thrombosis of the lower extremities, urinary tract infection (urine culture) and in the case of fever incidence. Patients after discharge were examined to determine postoperative complication including bleeding, fever, wound infection, the data related to postoperative gastrointestinal complications and endometritis at the second day and one and six weeks postoperation were collected.

STATISTICAL ANALYSIS

All data were entered and analysed by using SPSS software version 17. Statistical analysis of the data was performed using the chi-square test to compare percentages between groups and Student's t-test for correlated means.

RESULTS

In this study, statistical analysis showed that there was no statistically significant difference between two groups regarding age, parity, mean of gestational age and mean weight ($p>0.05$) [Table/Fig-1]. Possible febrile complication factors like recent respiratory infection, recent urinary infection and previous medical history was examined. The result of the study indicated that no case of fever, wound infection and endometritis was observed at the second day after surgery in intervention and control groups. Abnormal bleeding after cesarean delivery was observed in the control group in 4.4% of cases, but there was no statistically significant difference between the groups ($p=0.21$). The incidence of fever one week after the surgery was 2.2% and 8.9% in intervention and control groups respectively. Although febrile morbidity was slightly higher in the control than intervention group, this difference was not statistically significant ($p=0.16$). There was no significant correlation between the incidences of wound infection one week after the surgery in two groups but the incidence of wound infection was 11.1% and 8.9% in the intervention and control groups respectively. The incidence of endometritis in the first week after cesarean delivery showed no significant difference between the two groups. Postoperative febrile morbidity at 6 weeks post-surgery in the two groups was not statistically significant ($p=0.15$). Although the incidence of wound infection was not statistically significant in two groups, it is

Variable	Control group (n=45)	Intervention group (n=45)
Mean age in years	29.7±5.2	29.4±4.8
Mean parity	2±1.65	2.1±1.8
Mean gestation age at delivery in weeks	38.5±2.51	38.3±2.65
Mean weight	75.8±8.3	73.5±7.9

[Table/Fig-1]: Characteristics of subject in the study.

considerable that the cases of incidence of infection were much less in the intervention than the control group (7.7% and 15.6% the in intervention and the control groups, respectively). Incidence of endometritis at 6 weeks post-surgery was 6.7% and 26.7% in the intervention and control groups, respectively there was statistically significant difference between intervention and control groups ($p=0.011$). In comparison to uterine cavity cleansing on the postoperative gastrointestinal symptoms, nausea and vomiting after surgery and defecation timing and the incidence of nausea and vomiting during the early postoperative hours were 11.1% and 24.4% in the intervention and control groups, respectively ($p=0.09$). In 24.4% of the intervention group and 46.7% of control groups, time of defecation was more than 12 hours after surgery. This difference was statistically significant between two groups ($p=0.02$). In comparison, postpartum hemorrhage between the two groups was not statistically significant. The mean of labor lochia was 39.6% in control group and 37.4% in the intervention group that was 2 days fewer in the intervention group. In the examination of incidence rate of endometritis, fever and wound infection, vaginal discharge, except in cases where the culture was pathogenic organisms (GBS and Staph), no statistically significant relationship was observed between complications and the cultured organisms [Table/Fig-2].

Type of complication	Positive cultures (percentage)	Negative culture (percentage)	p-value
Febrile morbidity of second day	46.7	53.3	0.97
Second day wound infection	46.7	53.3	0.97
Second day Endometritis	46.7	53.3	0.97
First week febrile morbidity	47.1	52.9	0.72
First week wound infection	44.4	55.6	0.28
First week Endometritis	46.6	53.4	0.9
Sixth week febrile morbidity	46.6	53.4	0.9
Sixth week wound infection	48.8	51.3	0.21
Sixth week Endometritis	45.3	54.7	0.53

[Table/Fig-2]: Comparison of positive cultures of pathogenic factors for complications after cesarean in intervention and control groups.

DISCUSSION

The uterus cavity cleansing is a simple method that can cause the reduction of wound infection and febrile morbidity [5]. In this study, 6 weeks postoperative endometritis was considerably and significantly reduced by washing the uterine cavity. The incidence of fever, febrile morbidity and wound infection 6 weeks post-surgery was less in intervention group than control group, although this difference was not significant. Different studies have investigated uterine cavity cleansing with normal saline solution or with antibiotics. Lewis in his study compared rinsing uterine with saline and Cefoxitin and Ticarcillin with each other in the incidence of infection after caesarean and came to the conclusion that rinsing with antibiotics reduces postoperative febrile morbidity [8]. In a study by Memon et al., vaginal cleansing with 10% pyodine had shown a statistically significant reduction in postoperative composite infectious morbidities [9] and it showed a statistically significant reduction in the incidence of post caesarean endometritis. In contrast, in study by Viney aimed at evaluating the efficacy of antibiotics on wound infection and febrile morbidity, it has been shown that rinsing with antibiotics does not reduce fever, abdominal complication [10]. It was noteworthy that the cost of this method is relatively high and does not have special impact on the complications after cesarean delivery. In our study, it was suggested that rinsing with normal saline solution is cost effective compared to the use of antibiotics and cause reduction in infection and endometritis after cesarean delivery. In a study by Gungorduk, it was demonstrated that although rinsing with saline reduces caesarean wound infection, this reduction was not

statistically significant [11]. In the study by Viney, intraoperative vomiting was more in the group who had underwent rinsing but there was no statistically significant difference in terms of vomiting during operation, chorioamnionitis, endometritis, postoperative vomiting and febrile morbidity after surgery [10]. In our study, vomiting during the first hours after surgery was less and it can be said that uterine cavity cleansing and full suction of discharge can be helpful in reducing nausea and vomiting after surgery. Due to pathogenic factors in the incidence of endometritis after cesarean, intrapartum vaginal culture is considered as a unique measure in this study. In one study, the percentage of incidence of cultured factors through vagina and cervix were compared considering the complications after cesarean delivery. The results showed that there was no significant difference in the incidence of complications after cesarean delivery between the two groups showing culture of pathogenic and non-pathogenic vaginal discharge [12].

LIMITATION

The size of study sample was small. This study suggested that further studies are needed with larger sample size for evaluating infection, as well as complications like pain and discomfort during and after surgery until 6 weeks and the impact of uterus cavity cleansing on the possibility of adhesion after cesarean and its impact on endometriosis after cesarean.

CONCLUSION

Although in the current study, the reduction was not statistically significant in intervention group. Still, uterine cavity cleansing with normal saline solution during cesarean delivery may decrease postoperative complication. Further studies on larger group, at different institutes are suggested to validate the results.

ACKNOWLEDGEMENTS

Hereby, the authors of this study appreciate the cooperation of the patients and Deputy of research and technology of Shahrekord University of Medical sciences, Iran and all those who collaborated in the implementation and completion of this research. This study is the result of a general doctoral dissertation with 1604 code.

REFERENCES

- [1] Declercq E, Young R, Cabral H, Ecker J. Is a rising cesarean delivery rate inevitable? trends in industrialized countries, 1987 to 2007. *Birth*. 2011;38(2):99-104.
- [2] Betrán AP, Meraldi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, et al. Rates of caesarean section: analysis of global, regional and national estimates. *Paediatr Perinat Epidemiol*. 2007;21(2):98-113.
- [3] Reid VC, Hartmann KE, McMahon M, Fry EP. Vaginal preparation with povidone iodine and postcesarean infectious morbidity: a randomized controlled trial. *Obstet Gynaecol*. 2001;97(1):147-52.
- [4] Guzman MA, Prien SD, Blann DW. Post-cesarean related infection and vaginal preparation with povidone-iodine revisited. *Prim Care Update for OB/GYNs*. 2002;9(6):206-09.
- [5] Haas DM, Morgan Al Darei S, Contreras K. Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections. *Cochrane Database Syst Rev*. 2010;17(3): CD007892.
- [6] Haas DM, Pazouki F, Smith RR, Fry AM, Podzielski I, Al-Darei SM, et al. Vaginal cleansing before cesarean delivery to reduce postoperative infectious morbidity: a randomized, controlled trial. *Am J Obstet Gynaecol*. 2010;202(3):310.e1-6.
- [7] O'Leary JA, Mullins JH, Andrinopoulos GC. Ampicillin vs. ampicillin-gentamicin prophylaxis in highrisk primary cesarean section. *J Reprod Med*. 1986;31(1):27-30.
- [8] Lewis DF, Otterson WN, Dunning DR. Antibiotic prophylactic uterine lavage in cesarean section: a double-blind comparison of saline, ticarcillin, and cefoxitin irrigation in indigent patients. *South Med J*. 1990;83(3):274-76.
- [9] Memon S, Qazi RA, Bibi S, Parveen N. Effect of preoperative vaginal cleansing with an antiseptic solution to reduce post caesarean infectious morbidity. *J Pak Med Assoc*. 2011;61(12):1179-83.
- [10] Viney R, Isaacs C, Chelmow D. Intra-abdominal irrigation at cesarean delivery: a randomized controlled trial. *Obstetrics and Gynaecology*. 2012;119(6):1106-11.
- [11] Gungorduk K, Ascioglu O, Celikkol O, Ark C, Tekirdag Al. Does saline irrigation reduce the wound infection in caesarean delivery? *Journal of Obstetrics and Gynaecology: The Journal of the Institute of Obstetrics and Gynaecology*. 2010;30(7):662-66.
- [12] Elliott T, Casey A, Lambert PA, Sandoe J. Lecture Notes: *Medical Microbiology and Infection*. 2012:170-173.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Obstetrics and Gynaecology, Shahrekord University of Medical Science, Shahrekord, Iran.
2. Resident, Department of Obstetrics and Gynaecology, School of Medicine, Shahrekord University of Medical Sciences, Shahrekord, Iran.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Lobat Jafarzadeh,
Assistant Professor, Department of Obstetrics and Gynaecology,
Shahrekord University of Medical Science, Shahrekord, Iran.
E-mail: lobatjafarzadeh@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Nov 03, 2015**
Date of Peer Review: **Dec 18, 2015**
Date of Acceptance: **Apr 07, 2016**
Date of Publishing: **Jul 01, 2016**