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Vaginal Cleansing Before Cesarean Delivery for the Prevention of Endometritis and Surgical site Infection

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ABSTRACT

Objective: Aim of the study was to compare the frequency of endometritis and surgical site infection in vaginal cleansing group versus control in patients presenting for emergency cesarean delivery.

Study design: Randomized control trial.

Place and duration of the study: Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore. From: 28th September 2018 to 28th march 2019.

Methodology: A total number of 400 females undergoing cesarean section. Two groups were made, each patient was randomly assigned by lottery method into one of the two groups Group A and Group B. Vaginal area of Group A was cleaned with a povidone-iodine soaked vaginal swab for 30 seconds and the Group B was not cleaned prior to cesarean section. Both groups were followed for up to 7th postoperative day till the removal of stitches for any postoperative surgical site infection and 6 weeks postpartum after puerperium for any postoperative endometritis.

Results: In our study, out of 400 cases (200 in each group), the frequency of endometritis in Group-A was 2.5% and in Group-B 22% (n=11), p value was 0.0007, while surgical site infection was 1.5% (n=3) in Group-A and 5.5% (n=11) in Group-B, p value was 0.02.

Conclusion: Vaginal cleansing significantly reduces the risk of endometritis and surgical site infection when compared to those of control group in patients presenting for emergency cesarean delivery.

Keywords: Cesarean-section, Vaginal cleansing, Endometritis, Surgical site infection and puerperium

INTRODUCTION

Cesarean birth, the surgical delivery of the baby, is an alternative to vaginal delivery. Though it has been known since ages, it revolutionized the practice of obstetrics is not only saving the life of a neonate, that would not be possible in an event of natural process of birth through a spontaneous vaginal delivery; but also added to the safety of mother in complicated parturition. Cesarean delivery is the highest surgical procedure performed throughout the world by obstetricians (1). The deliveries through cesarean section represent a large percentage around the globe where US accounts for 30% of cesarean deliveries and operation is considered to be the most common method of major surgery for women (2). The hospital-based studies show that almost 21-40% births in Pakistan take place through cesarean section (3-4). As no procedure is without its hazards, many patients suffer post-operative infection thereafter that causes a great deal of discomfort to the mother as well as the care provider and it also affects the standard of maternal care to the neonate. To reduce the risk of infections, the patients are routinely given antibiotics before or during the cesarean section surgery, but still some women suffer from complications (4). The women who undergo cesarean section have 5-20 times more risk to get infected as compared to those with normal vaginal delivery. It has been identified that 1 in 4 women tend to develop endometritis, an infection of the uterus; while 1 in 10 tend to develop a problem with their skin incision after the surgery (5). The complications that arise due to these infections after the surgery are the most significant cause of maternal morbidity for example endometritis established postoperatively due to infection not only cause a temporary ailment but may also end up in hysterectomy due to widespread infection and if the womb is saved it can cause

problems with conception ultimately leaving the patient infertile thereafter. In certain cases, where the mothers tend to survive, their stay in hospital becomes prolonged due to sore wounds, fever, and mostly because of the uterus lining inflammation (6). Surgical site infections eventually lead in dehiscence of wound and add to maternal morbidity. According to the study conducted by Cochrane pregnancy and childbirth group Cleaning the vagina with povidone-iodine before the operation rends to reduce the risk of postoperative endometritis from 71% in control group to 3.6% in vaginal cleansing group and almost no effect on wound infections and risk reduction was specifically seen in patients with pre-labor rupture of membranes (7). Keeping in view the adverse effects of endometritis and surgical site infection this study aims to investigate the effect of vaginal cleansing before cesarean section to decrease the risk of endometritis and skin infection. International data has shown vaginal cleansing to be beneficial in reducing frequency of endometritis and surgical site infection. The current study was conducted to confirm previous studies results in our population, if this study also supports the previous results, then vaginal cleansing may be adopted as a routine to reduce the incidence of endometritis and surgical site infection.

MATERIAL AND METHODS

The study design for this investigation was randomized control trial and it was carried out in Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore.

Sample size: A sample size of 400 (200 in each group) was calculated as 5% level of significance and 80% power of test and taking expected frequency of endometritis in vaginal cleansing group is 1.4% and control group is 8.8%.

Sampling method: Non-probability consecutive sampling

Sample selection

Inclusion criteria: All gravid females undergoing emergency cesarean section delivery after 37 weeks of gestation as per operational definition. Age 17 to 35 years.

Exclusion criteria: Women with h/o chronic liver disease (assessed on history and s/bilirubin >2.0 mg/dl). Women with chronic renal failure (assessed on history and s/creatinine >1.5 mg/dl). Patients taking immunosuppressive therapy or exogenous steroids (assessed on history and medical record). Patient with diabetes mellitus (hbA1c greater than 6.9) Women with Pregnancy induced hypertension (BP greater than 140/90 on two. special occasions, pre-eclampsia (BP 140/90 plus proteinuria), eclampsia (fits with raised BP). Woman with known allergy to povidone-iodine solution.

Data collection: A total of 400 females undergoing cesarean sections in the emergency Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore, fulfilling the Inclusion criteria were selected. Informed written consent was taken from all of them. After that two groups were made, each patient was randomly assigned by lottery method into one of the two groups namely Group A and Group B.

Cleaning procedure: Vaginal area of Group A was cleaned with a povidone-iodine soaked vaginal swab for 30 seconds and the Group B was not cleaned prior to cesarean section. Both groups were followed for up to 7th postoperative day till the removal of stitches for any post- operative surgical site infection and 6 weeks postpartum after puerperium for any postoperative endometritis (as per- operational definition). This all data (age, parity, endometritis wound infection was documented on a specially designed Performa and then assessed accordingly.

Data analysis: Statistical analysis was performed using SPSS version 20.0. Mean + SD was calculated for quantitative variable like age, BMI. Frequency and percentages were calculated for parity and pre-labor rupture of membranes. Chi square test (p value <0.05) was used to find endometritis and surgical site infection in both groups. Data was stratified for age, BMI, socioeconomic status and parity. Post stratification chis square test was used taking p value <0.05 as significant.

RESULTS

A total of 400 cases (200 in each group) fulfilling the selection criteria were enrolled to compare the frequency of endometritis and surgical site infection in vaginal cleansing group versus control in patients presenting for emergency cesarean delivery. Age distribution shows that 20.5% (n=41) in Group-A and 18% (n=36) in Group-B were between 17-25 years of age whereas 79.5% (n=159) in Group-A and 82% (n=164) in Group-B were between 26-35 years of age, 28.55+3.97 years in Group-A and 29.32+3.53 years in Group-B (Table No. 1).

Table No. 1 Age Distribution

	Group-A (n=200)		Group-B (n=200)	
Age (in years)	**No. of patients**	**%**	**No. of patients**	**%**
17-25	41	20.5	36	18
26-35	159	79.5	164	82
Total	**200**	**100**	**200**	**100**
Mean ±SD	**28.55±3.97**		**29.32±3.53**	

Parity distribution shows that 88.5% (n=177) in Group-A and 84%(n=168) in Group-B were between 1-3 parity and 11.5% (n=23) in Group-A and 16% (n=32) had >3 parity (Table No. 2).

Table No. 2 Parity Distribution

Parity	Group-A (n=200)		Group-B (n=200)	
	No. of patients	%	No. of patients	%
1-3	177	88.5	168	84
>3	23	11.5	32	16
Total	**200**	**100**	**200**	**100**

Mean BMI of the patients was done; it shows that 28.88+3.46 in Group-A and 28.92+2.96 in Group-B (Table No. 3).

Table No. 3 Mean BMI of the Patients

	Group-A (n=200)		Group-B (n=200)	
	Mean	SD	Mean	SD
BMI	28.88	3.46	28.92	2.96

Frequency of PROM was recorded in 20% (n=40) in Group- A and 20.5% (n=41) in Group-B whereas 80% (n=160) in Group-A and 79.5% (n=159) in Group-B had no findings of PROM (Table No. 4).

Table No. 4 Frequency of PROM

PROM	Group-A (n=200)		Group-B (n=200)	
	No. of patients	%	No. of patients	%
Yes	40	20	41	20.5
No	160	80	159	79.5
Total	**200**	**100**	**200**	**100**

Frequency of endometritis in Group-A was 2.5% and in Group-B 22% (n=11), p value was 0.0007, while surgical site infection was 1.5% (n=3) in Group-A and 5.5% (n=11) in Group -B, p value was 0.02 (Table No. 5).

Table No. 5 Frequency of Endometritis and Surgical site infection

Outcome	Group-A (n=200)		Group-B (n=200)		P value
	No. of patients	%	No. of patients	%	
Endometritis	5	2.5	22	11	0.0007
	195	97.5	178	89	
SSI	3	1.5	11	5.5	0.02
	97	98.5	189	94.5	

The data was stratified for age, BMI, socioeconomic status and parity. Post stratification chis square test was used taking p value <0.05 as significant (Table No. 6-8).

Table No. 6 Stratification for Age

Age: 17-25 Years					
Outcome	**Group-A(n=41)**		**Group-B (n=36)**		**P value**
	No. of patients	**%**	**No. of patients**	**%**	
Endometritis	2	4.88	5	13.89	0.17
	39	95.12	31	86.11	
SSI	0	0	2	5.56	0.13
	41	100	34	94.44	
Age: 26-35 years					
Outcome	**Group-A (n=159)**		**Group-B (n=164)**		**P value**
	No. of Patients	**%**	**No. of Patients**	**%**	
Endometritis	3	1.89	17	10.37	0.001
	156	98.11	147	89.63	
SSI	3	1.89	9	5.49	0.48
	156	98.11	155	94.51	

Table No. 7 Stratification for Parity

Parity: 1-3					
Outcome	Group-A (n=177)		Group-B (n=168)		P value
	No. of patients	%	No. of patients	%	
Endometritis	3	1.69	17	10.12	0.0008
	174	98.31	151	89.88	
SSI	3	1.69	9	5.36	0.06
	174	98.31	159	94.64	

Parity: >3					
Outcome	Group-A (n=23)		Group-B (n=32)		P value
	No. of patients	%	No. of patients	%	
Endometritis	2	8.70	5	15.63	0.45
	21	91.30	27	84.37	
SSI	0	0	2	6.25	0.22
	23	100	30	93.75	

Table No. 8 Stratification for BMI

BMI: up to 30					
Outcome	Group-A (n=121)		Group-B (n=122)		P value
	No. of patients	%	No. of patients	%	
Endometritis	3	2.48	15	12.30	0.003
	118	97.52	107	87.70	
SSI	2	1.65	10	8.20	0.01
	119	98.35	112	91.80	

BMI: >30					
Outcome	Group-A (n=79)		Group-B (n=78)		P value
	No. of patients	%	No. of patients	%	
Endometritis	2	2.53	7	8.97	0.08
	77	97.47	71	91.03	
SSI	1	1.27	1	1.28	1.61
	78	98.73	77	98.72	

DISSCUSSION

Cesarean sections currently account for approximately one-third of the babies born in the United States. Cesarean section deliveries are often complicated by infections occurring after the surgery. Endometritis, an infection of the uterus in the postpartum period, can complicate the postoperative course of a cesarean delivery 6% to 27% of the time. This complication, up to 10 times more frequent after a cesarean delivery than after vaginal delivery, can lead to serious complications of bacterial infection in the blood (10% to 20%), peritonitis (general infection in the abdominal cavity), intra-abdominal abscess (cavity filled with infected material), and sepsis. Vaginal cleansing immediately before cesarean delivery in women in labor and in women with ruptured membranes reduces the risk of postoperative endometritis because this method is generally simple and inexpensive. We planned this study to confirm results in our population, if this study also supports the previous results, then vaginal cleansing may be adopted as a routine to reduce the incidence of endometritis and surgical site infection. In our study, out of 400 cases (200 in each group), 20.5% (n=41) in Group-A and 18% (n=36) in Group-B were between 17-25 years of age whereas 79.5% (n=159) in Group-A and 82% (n=164) in Group-B were between 26-35 years of age, 28.55+3.97 years in Group-A and 29.32+3.53 years in Group-B, frequency of endometritis in Group-A was 2.5% and in Group-B 22% (n=11), p value was 0.0007, while surgical site infection was 1.5%(n=3) in Group-A and 5.5% (n=11) in Group-B, p value was 0.02. These findings are supported by a study conducted in PIMS Islamabad showed similar results that is risk of endometritis was found to be 1.4% in vaginal cleansing group as compared to 8.8% in control

group (p=0.00) while that of wound infection came 1.4% in vaginal cleansing and 3.7% in control group (p=0.126) (3). Another study conducted by Cochrane pregnancy and childbirth group Cleaning the vagina with povidone-iodine before the operation tends to reduce the risk of postoperative endometritis from 71% in control group to 3.6% in vaginal cleansing group and almost no effect on wound infections and risk reduction was specifically seen in patients with pre-labor rupture of membranes (7). Though the rate of endometritis is higher in control group, however, it supports vaginal cleansing before cesarean section. A recent systemic review revealed that sixteen trials (8) (4,837 women) on vaginal cleansing immediately before cesarean delivery were identified as relevant and included in the review. In most of the included studies, 10% povidone–iodine was used as an intervention. The most common way to perform the vaginal cleansing was the use of a sponge stick for approximately 30 seconds. Women who received vaginal cleansing before cesarean delivery had a significantly lower incidence of endometritis (4.5% compared with 8.8%; RR 0.52, 95% CI 0.37–0.72; 15 studies, 4,726 participants) and of postoperative fever (9.4% compared with 14.9%; RR 0.65, 95% CI 0.50–0.86; 11 studies, 4,098 participants) compared with the control group. In the planned subgroup analyses, the reduction in the incidence of endometritis with vaginal cleansing was limited to women in labor before cesarean delivery (8.1% compared with 13.8%; RR 0.52, 95% CI 0.28–0.97; four studies, 440 participants) or those with ruptured membranes (4.3% compared with 20.1%; RR 0.23, 95% CI 0.10–0.52; three studies, 272 participants). They concluded that vaginal cleansing immediately before cesarean delivery in women in labor and in women with ruptured membranes reduces the risk of postoperative endometritis. Because it is generally inexpensive and a simple intervention, we recommend preoperative vaginal preparation before cesarean delivery in these women with sponge stick preparation of povidone–iodine 10% for at least 30 seconds. More data are needed to assess whether this intervention may be also useful for cesarean deliveries performed in women not in labor and for those without ruptured membranes.

CONCLUSION

Vaginal cleansing significantly reduces the risk of endometritis and surgical site infection when compared to those of control group in patients presenting for emergency cesarean delivery.

CONFLICT OF INTEREST

Author declared no conflict of intertest.

Ethical approval:

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