

Influence of Pre-operative Vaginal Cleansing with Povidone Iodine on Post Cesarean Infection

¹Enas Jaleel Alobaidy

¹Department of Obstetrics and Gynecology, College of Medicine, University of Diyala, Iraq.

Corresponding author: Enas Jaleel Alobaidy

ABSTRACT

Background: Finding clinical approaches to reduce the infectious hazards of cesarean operation is very essential. The main aim of this study was to show the outcome of using pre-operative vaginal cleansing with antiseptic solution on post-caesarean infections.

Methods: A randomized-controlled trial conducted on 200 pregnant women on elective Cesarean section. They divided into two groups; the control group, their operations were conducted with standard classical abdominal scrub alone while other group (experimental) with vaginal povidone iodine preparation in addition to the standard abdominal scrub. Every woman was monitored post-operatively for development of fever, endometritis, and wound infection, duration of postoperative antibiotics administration, postoperative stay and neonatal outcome.

Results: The two groups, were similar in age, teaching level, body mass index, and parity. The variables in both groups are: Post-Cesarean endometritis developed in 6% of women who received a vaginal preparation pre-operatively and 15% of the controls. A total of 30% of control women and 20% of women in the experimental group had post-operative febrile illness. Wound infections were unusual complications that happened only in two percent of the control patients and one percent of patient in the group.

Conclusion: Pre-operative vaginal handling with povidone iodine reduced the danger of post-Cesarean endometritis. However, this procedure doesn't decline the whole risk of post-operative wound infection or fever.

Keywords: Cesarean Delivery, Endometritis, Povidone Iodine.

Correspondence:

Enas Jaleel Alobaidy
Department of Obstetrics and
Gynecology, College of Medicine,
University of Diyala, Iraq.

Submitted: 30-09-2020

Revision: 30-10-2020

Accepted Date: 30-11-2020

DOI: 10.31838/jcdr.2020.11.04.46

INTRODUCTION

Since the operation of cesarean section is related with fewer pain, many women are willing to delivered by it. Currently cesarean delivery is comments surgical operation in many countries (1). Even with the point that there are several services, tools, hospital beds and consultants acts together with this action, pregnancy complication and problems is more in in women undertaking operation (2).

The occurrence of infection subsequent cesarean section differs regarding as the socio-economic aspects, and the use of antibiotics prior to operation has expressively different (3). Perhaps infection may occur during first week afterward the delivery, infection may occur in 2.5-16% of the mothers (4)

Endometritis is the commonest reason of fever and infection subsequently after the delivery and it is one of its chief reasons (5). As, the frequency of endometritis after surgical operation had been informed to be 7-20% (6).

American Congress of Obstetricians and Gynecologists (ACOG) have suggested a single dose of antibiotics for mothers who are at great hazard of pelvic infections after surgery. To decrease the occurrence of severe pelvic infection (7)

Puerperal infection is define any form of bacterial infection in the genital tract post-delivery.⁽⁴⁾⁽⁵⁾ The kind of delivery (normal or Cesarean) is the most significant and important risk factor for puerperal infection ⁽⁶⁾. Rates of Admission to hospitalization for wound complications and endometritis were increased significantly in women enduring a planned primary cesarean delivery compared with those having a scheduled vaginal birth⁽⁷⁾ while Compared with cesarean section delivery, endometritis following vaginal delivery is somewhat less common.^(8, 9)

Persistent post-delivery fever is rarely due to antimicrobial-resistant bacteria, or due to any drug side effects. The woman may be discharged home once she has been afebrile for at least 24 hours.^(11, 12)

Meanwhile one significant way to prevent ascending spread of variable vaginal and cervical endometritis, by vaginal preparation before the surgery. Rendering to research revisions, vaginal washing with povidone iodine preceding to hysterectomy can reduce the possibility of infection, but there is slight evidence regard vaginal washing with povidone -iodine before operation (8).

Prevention of Infection: through time a number of plans have been tested to avoid or at least alleviate the severity of postpartum infections, this includes: Perioperative Antimicrobial Prophylaxis, prenatal Management of Vaginitis and certain Operative Technique such as permitting the placenta to separate freely compared with removing it manually drops the risk of infection. Exteriorizing the uterus to close the hysterotomy may lessening febrile morbidity⁽¹³⁾.

Povidone iodine: Forty-years past, povidone iodine was underway to be used in the pre-operative preparations. It contains polyvinyl-pyrrolidone, which is a water soluble complex of iodine added to a synthetic polymer. The most regularly manufactured form is the 10% solution in water.⁽¹⁵⁾ It has a bactericidal influence and it is effective against bacteria, fungi and even spores⁽¹⁵⁾. The bactericidal effect occurs in seconds and it could be due to inactivation of the vital cytoplasmic substrates that are very significant for bacterial viability.

Choices on the using of pre-treatment povidin include two basic points: (1) the safety of the treatment and (2) the efficiency of the treatment.

Both pathological and histological studies didn't catch any opposing effect of povidone-iodine on the wound healing (16). However, no sign showing that povidone-iodine pre-treatment could support in wound healing. Researchers have studied the effects of povidone-iodine on numerous cellular mechanisms in of wound healing. In spite of the in vitro cytotoxicity effect, in vivo studies presented that povidone-iodine doesn't inhibit wound healing, especially when it is used in concentrations of 1% or less (17). Resistance to povidone-iodine is very infrequent because it needs changes in the bacterial proteins which is very rare(18). Povidone iodine besides has an effect on bacterial enzymes and exotoxins, which might cause better damage. A study on the resistance to antiseptic in 20 bacterial strains revealed that povidone-iodine destroyed all the bacteria within around 20 seconds (19).

This study aimed to assess the use of pre-Cesarean preparation of the vagina with povidone-iodine to reduce the occurrence of post-cesarean endometritis in women go through elective cesarean delivery.

MATERIALS AND METHODS

A randomized control trial, was done in the obstetrics and gynecology department at Al Batool Teaching Hospital, diayla, Iraq, From Feb 2019 to Feb 2020.

A 400 pregnant women where included in our study who go through an elective cesarean delivery at ≥ 37 weeks gestational age and had no apparent or sign of infections (temperature 38°C or greater). History and physical examination containing speculum and pelvic exam to exclude leaking liquor and the cervical dilatation. Determination of the gestational age by ultrasound, non-stress test, hemoglobin estimation and general urine exam were done for all patients.

Exclusion criteria were: 1- Emergent cesarean2- Antepartum hemorrhage 3- Preterm delivery and preterm rupture of membrane 4- Fetal distress5- Chorioamnionitis6- lab our started with Cervical dilation more than 3 cm.7 - Active genital herpes8 - Allergy to iodine-containing solutions10- Medical problems like D.M, HT, anemia, and patient on steroid therapy.

All subjects were accidentally assigned to two groups. 1st study group those who established vaginal cleansing with povidone-iodine and abdominal scrub, and the 2nd controlled group who received a typical abdominal scrub only.

The outcome of study was assess post-cesarean endometritis, other maternal complications included febrile

illness, wound complication, blood cultures positive, length of the hospital stay, duration of antibiotics therapy.

Postoperative fever is a known as as any temperature around 38° C after cesarean delivery, except for for the first 24 hours after the surgery. Wound infection is defined as erythema, wound edge separation with purulent discharge, which need antibiotics, debridement.

Endometritis was defined as temperature 38 C or more on any two post-operative days (exclude the first 24 hours after delivery). Adding, diagnosis should contain one of the these signs:

1. Palpate Tender Uterus b) Foul-smell Vaginal Discharge
2. Tachycardia
3. Leukocytosis (higher than 12,000/ mm3

Data Analysis and Statistics:-The data are composed, organized and tabulated by using computer software Statistics Package for Social Science (SPSS) version 17. The results are stated in form of numbers, percentages and Pearson Chi-square which was statistically significant at p.value less than 0.05 and statistically not significant at p.value more than 0.05. The figures are done by using Microsoft office excel 2007.

RESULT

Table 1- Post-cesarean results in the

1. Post-cesarean endometritis found in (15%) of control group and in (6%) of patients who received pre-operative vagina-scrub (P value< 0.05) which is significant.
2. Febrile illness occurred in (30%) of control group and (20%) in the study group (P value> 0.05). Wound infection was is unusual complication found in (2%) of control group and in (1%) the study group (P value > 0.05).
3. Post-operative interval stay in hospital > 3 day (20%) in control group and (5%) in the study group (P value > 0.05) while, Post-operative length of stay ≤ 3 day (80%) in the control group and (95%) in the study group (P value > 0.05).
4. Numbers of days on antibiotics ≤ 3 days (25%) in control group and (50%) in the study group(P value < 0.05)). Numbers of days on antibiotics > 3 days (75%) in control group and (50%) in the study group (P value < 0.05).

			Study groups		Total	P value
			Study group	Control group		
Endometritis	Present	Count	6	15	21	0.043
		%	6.0%	15.0%	10.5%	
	Absent	Count	94	85	179	
		%	94.0%	85.0%	89.5%	
Total		Count	100	100	200	
		%	100.0%	100.0%	100.0%	
Febrile morbidity	Present	Count	20	30	50	0.141
		%	20.0%	30.0%	25.0%	
	Absent	Count	80	70	150	

		%	80.0%	70.0%	75.0%	
Total		Count	100	100	200	
		%	100.0%	100.0%	100.0%	
Wound infection	Present	Count	1	2	3	0.990
		%	1.0%	2.0%	1.5%	
	Absent	Count	99	98	197	
		%	99.0%	98.0%	98.5%	
Total		Count	100	100	200	
		%	100.0%	100.0%	100.0%	
Post-operative length of stay	>3 days	Count	5	20	25	0.002
		%	5.0%	20.0%	12.5%	
	≤3 days	Count	95	80	175	
		%	95.0%	80.0%	87.5%	
Total		Count	100	100	200	
		%	100.0%	100.0%	100.0%	
Number of days on antibiotics	≤3 days	Count	50	75	125	0.001
		%	50.0%	75.0%	62.5%	
	>3 days	Count	50	25	75	
		%	50.0%	25.0%	37.5%	
Total		Count	100	100	200	
		%	100.0%	100.0%	100.0%	

Table 2- Features of women in “vaginal cleansing” and “no vaginal cleaning” groups. Both clusters were similar in age, teaching degree, body mass index, and parity. There was no significant difference between each groups regarding degree of the hemoglobin and white blood cell count before and after the surgery

characteristics	No vaginal cleaning group (N=200)	Vaginal cleaning group (N=200)	P value
Age (year)			
<30	103(50.2)	102(49.8)	0.920
>30	97(49.7)	98(50.3)	
Education			
Elementary	4.5	5.4	0.13
Hight school	56.5	49.5	
University	39	44.7	
Gravidity			
≤2	105(46.9)	119(53.1)	0.158
>2	95(54.0)	81(46.0)	
Abortion			
No	123(61.5)	136(68.0)	0.174
Yes	77(38.5)	64(32.0)	
BMI [†] (kg/m ²)			
<30	65(32.5)	55(27.5)	0.275
≥30	135(67.5)	145(72.5)	
Hb ^{**} before surgery			
<11	30(15.0)	26(13.0)	0.564
≥11	170(85.0)	174(87.0)	
Hb after surgery			
<10	58(29.0)	61(30.5)	0.743
≥10	142(71.0)	139(69.5)	
WBC before surgery			
<10000	137(68.5)	119(59.5)	0.061
≥10000	63(31.5)	81(40.5)	
WBC after surgery			
<12000	93(46.5)	89(44.5)	0.688
≥12000	107(53.5)	111(55.5)	

DISCUSSION

Vaginal washing with antiseptic solutions before any gynecological surgical operation have been done since 1970 and have shown a decline in postoperative infection

Post-partum wound, pelvic, and endometrial infections are most frequently poly-microbial. The major are vaginal organisms, adding to skin and rectal contaminants. Throughout and after cesarean section, the uterus is still exposed in continuum to the vagina, correspondingly the surgeon's hand, reaching below the presenting part, come to be direct connection with vagina (20). In such cases, the vaginal organisms are in direct contact with the abdominal cavity, uterus, and also the abdomen incision. Cleaning of all the body surfaces that are in communication with the surgical operation is necessary to be with aseptic procedures. Although such preparation doesn't give in a sterile field, but it tend to reduction the bacterial and fungal micro-organisms naturally existing in the skin and in the mucosa (14).

In this study we found that the incidence of endometritis in a study group was 6% and in control group 15% which is similar with the outcomes of Star et al (21). Within their study population, they presented a advantage of a pre-operative vaginal wash just before the cesarean. The rate of post-cesarean endometritis is significantly lowered in those women who were arranged with abdominal and vagina povidon iodine as likened to those with an abdomen scrub only. A vaginal povidone iodine preparations; might reduce endometrium contact to the numeral of bacterial species at the time of operation.

In agreement with our study, the study done by Haas et al, The main outcomes were consist of postoperative fever, sepsis, endometritis, re-admission, and wound infection. Around 9% developed this composite, with fewer women in the vaginal cleansing group (6.5%) compared with control group (11.7%) (22). The variance in the reported post-operative rates of endometritis might be due to the technique of procedure and sort of materials used in vaginal wash itself or could be the quantity of antiseptic that was used could have effect on the infectious result.

In our study we found that post cesarean endometritis decrease with use pre-operative vaginal preparation with povidone-iodine, while Reid et al (23) found that vaginal scrub didn't have an influence on the rate of postoperative endometritis, fever, or wound-infection.

In this study we used prophylactic antibiotics at time of umbilical cord clamping and this is go with with result of Waltsetal (24), in their study that parenteral antibiotics reduce postoperative endometritis of approximately 50% and in spite of the use of prophylactic antibiotics; failure of prophylaxes commonly occurred, which could be due to a change in the vaginal flora or resistance to antibiotics.

CONCLUSION

Pre-operative vaginal cleaning with povidone iodine decreased the risk of post-Cesarean endometritis. On the other hand, this protocol doesn't fall the whole risk of post-operative wound infection or fever.

Recommendations: Vagina cleaning with povidone iodine before the Cesarean section declines the risk of post-

operative endometritis with parenteral antibiotics prophylaxis at the time of clamping the umbilical cord.

CONFLICT OF INTEREST

None

REFERENCES

1. American College of Obstetricians and Gynecologists, Task Force on Cesarean Delivery Rates: Evaluation of cesarean delivery 2000.
2. Hamilton, B.E., Martin, J.A., & Ventura, S.J. National vital statistics reports. *National Vital Statistics Reports* 2009; 57(12).
3. MacDorman MF, Menacker F, Declercq E. Cesarean birth in the United States: epidemiology, trends, and outcomes. *Clinics in perinatology* 2008; 35(2): 293-307.
4. American College of Obstetricians and Gynecologists: Fetal lung maturity. Practice Bulletin No. 97, 2008.
5. Berg CJ, Chang J, Callaghan WM, Whitehead SJ. Pregnancy-related mortality in the United States, 1991-1997. *Obstetrics & Gynecology* 2003; 101(2): 289-296.
6. Deneux-Tharoux C, Carmona E, Bouvier-Colle MH, Bréart G. Postpartum maternal mortality and cesarean delivery. *Obstetrics & Gynecology* 2006; 108(3): 541-548.
7. Declercq E, Barger M, Cabral HJ, Evans SR, Kotelchuck M, Simon C, Heffner LJ. Maternal outcomes associated with planned primary cesarean births compared with planned vaginal births. *Obstetrics & Gynecology* 2007; 109(3): 669-677.
8. Maberry MC, Gilstrap LC, Bawdon R, Little BB, Dax J. Anaerobic coverage for intra-amniotic infection: maternal and perinatal impact. *American journal of perinatology* 1991; 8(5): 338-341.
9. Baksu A, Kalan A, Ozkan A, Baksu B, Tekelioğlu M, Goker N. The effect of placental removal method and site of uterine repair on postcesarean endometritis and operative blood loss. *Acta obstetrica et gynecologica Scandinavica* 2005; 84(3): 266-269.
10. Tita AT, Hauth JC, Grimes A, Owen J, Stamm AM, Andrews WW. Decreasing incidence of postcesarean endometritis with extended-spectrum antibiotic prophylaxis. *Obstetrics & Gynecology* 2008; 111(1): 51-56.
11. Costantine MM, Rahman M, Ghulmiyah L, Byers BD, Longo M, Wen T, Saade GR. Timing of perioperative antibiotics for cesarean delivery: a metaanalysis. *American journal of obstetrics and gynecology* 2008; 199(3): 301-e1.
12. Chaim, W, Bashiri A, Bar-David J, Shoham-Vardi I, & Mazor M. Prevalence and clinical significance of postpartum endometritis and wound infection. *Infectious diseases in obstetrics and gynecology* 2000; 8(2): 77-82.
13. Atkinson MW, Owen J, Wren A, Hauth JC. The effect of manual removal of the placenta on post-cesarean endometritis. *Obstetrics & Gynecology* 1996; 87(1): 99-102.

14. Osborne NG, Wright RC. Effect of preoperative scrub on the bacterial flora of the endocervix and vagina. *Obstet Gynecol* 2005; 50: 148-150.
15. Cape BR, Dobson P. *Bailliere's Nurses Dictionary 18th edition*.
16. Hägglund L, Christensen KK, Christensen P. Effect of a strict preoperative hygienic routine on the rate of infections following cesarean section. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 1986; 23(3-4): 187-194.
17. Mayer DA. Povidone-iodine and wound healing: a critical review. *Wounds* 1993; 5: 14-23.
18. Klossner BL, Widmer HR, Frey F. Non development of resistance by bacteria during hospital use of povidone-iodine. *Dermatology* 1997; 195(2): 10-13.
19. Koing N, Reimer K, Fleieher W, & Koing W. Effects of beta isodonna on the parameters of host defence. *Demwrology* 1997; 195(2): 42-48.
20. Haeri P, LL F. Effect of different pre-operative vaginal preparations on morbidity of patients undergoing abdominal hysterectomy. *South African Medical Journal* 1976; 50(49): 1984-1986.
21. Starr RV, Zurawski J, Ismail M. Preoperative vaginal preparation with povidone-iodine and the risk of postcesarean endometritis. *Obstetrics & Gynecology* 2005; 105(5): 1024-1029.
22. Haas DM, Pazouki F, Smith RR, Fry AM, Podzielniski I, Al-Darei SM, Golichowski AM. Vaginal cleansing before cesarean delivery to reduce postoperative infectious morbidity: a randomized, controlled trial. *American journal of obstetrics and gynecology* 2010; 202(3): 310-e1.
23. Reid VC, Hartmann KE, MC Mahon M, Fry EP. Vaginal preparation with povidone iodine and post cesarean infectious morbidity: a randomized controlled trial. *Obstetrics & Gynecology* 2001; 97(1): 147-152.
24. Watts DH, Hillier SL, Eschenbach DA. Upper genital tract isolates at delivery as predictors of post-cesarean infections among women receiving antibiotic prophylaxis. *Obstetrics and gynecology* 1991; 77(2): 287-292.