Original Article

Vaginal Cleansing Prior to Cesarean Section and Post-Operative Infectious Morbidity

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Abstract

Objective: To compare the frequency of post-operative infectious morbidity in patients undergoing emergency cesarean section with and without pre-operative vaginal cleansing.

Methodology: A Randomized controlled trial in the department of obstetrics and gynecology, PIMS, Islamabad from 1st September 2014 to 31st January 2015 was conducted including 434 patients. Group B women received only abdominal and vulval scrubbing while Group A received additional vaginal cleansing with pyodine. Patients were followed up for development of infectious morbidity up to three weeks.

Results: Mean age of 28.4 ± 4.6 years in group A and 27.6 ± 5.9 years in group B. Fever was seen in 9 (4.1%) women in group A and 16 (7.4%) in group B (p=0.149). Endometritis was noted in 3 (1.4%) women in group A and 19 (8.8%) in group B (p=0.000). Wound Infection occurred in 3 (1.4%) women in group A and 8 (3.7%) in group B (p=0.126).

Conclusion: Use of antiseptic for vaginal cleaning before cesarean section decreased postpartum infectious morbidity due to endometritis.

Keywords: Cesarean section, vaginal cleansing, infectious morbidity, endometritis.

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Introduction

Lower segment cesarean section is the most commonly performed emergency operation in obstetrics. The cesarean section rate varies in different hospitals and regions depending upon the level of facility as well as the catchment area. The cesarean section rates range between 21-29% in United States of America and United Kingdom. In Pakistan, the incidence is mostly in the range of 21-40% in the referral level hospitals.[1]

The infectious morbidity after cesarean section is a significant cause of maternal morbidity. According to WHO, maternal morbidity is defined as "any health condition attributed to and/or aggravated by pregnancy and delivery, having a negative effect on women well-being".[2] In developing countries incidence of post-operative infections is higher perhaps due to sub optimal sterilization and inappropriate use of antibiotics. Common infectious morbidity includes wound infections, lower urinary tract infections, pyelonephritis, mastitis, endometritis, myometritis, peritonitis and pneumonia.[3]

Post-cesarean endometritis is the commonest infectious condition after lower segment cesarean section. The incidence of this complication is 5-20 times higher after cesarean section as compared to

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vaginal delivery. It is usually caused by multiply mixed micro-organisms.[4] The presenting complaints of endometritis are usually pain lower abdomen, fever, foul smelling vaginal discharge and heavy vaginal bleeding.[5] Postpartum infectious morbidity after cesarean section may be associated with numerous risk factors including repeated vaginal examinations, prolonged duration of labor, prolonged rupture of membranes, maternal anemia, prolonged duration of surgery, pre-existing pelvic and vaginal infection, failure to use prophylactic antibiotics, obesity, diabetes and emergency nature of operation contribute to higher infection rates.[6]

The incidence of wound infection is variable after C-section ranging from 3 -15%. It causes an emotional, physical and financial burden on the patient and healthcare facility.[7] Different interventions have been assessed at cesarean sections to decrease post-operative infections. These include antiseptic showering, hair clipping instead of shaving, changing surgical techniques, avoiding manual placental delivery and cervical dilatation during a cesarean. [3]

The careful cleansing of the body surfaces that come in contact during operation can reduce the presence of micro-organisms and risk of infection. Vaginal cleaning before cesarean section is not routinely practiced although there is some literature supporting its use to decrease the incidence of post-operative infectious morbidity.[8,9] The reported incidence of maternal complications also depends upon the method of data collection and the duration of follow up.[10] Three large trials in the last decade showed that pre-operative vaginal cleansing along with parenteral antibiotics decreased the risk of post-operative endometritis.[11,12,13] Povidone iodine was found to cause a sudden decrease in a number of aerobic and anaerobic bacteria in 10 minutes after administration.[14] Asghania et al found no significant difference in febrile morbidity and wound infection but a decrease in endometritis was seen.[15] In contrast another large trial did not show a decrease in endometritis. [16]

The rationale of our study was to assess the efficacy of preoperative vaginal cleansing, a low-cost intervention for reducing post-operative infectious morbidity in emergency cesarean sections.

Methodology

A randomized controlled trial was carried out in the department of obstetrics and gynecology, MCH Unit 1, PIMS, SZABMU, Islamabad. This study was conducted from 1st September 2014 to 31st January 2015 using non-probability consecutive sampling. The sample size was calculated using the WHO calculator with the level of significance of 0.05 and 95% confidence interval. A total of 434 patients were enrolled in the study with 217 in each group. In group A, 217 women received vaginal cleansing as well as routine vulvar and abdominal scrubbing while in group B 217 women received only routine vulvar and abdominal scrub.

For study purposes, febrile morbidity was defined as oral temperature of 38^{o} centigrade after 24 hours of cesarean section. Endometritis was the presence of uterine tenderness and foul-smelling lochia up to three weeks post operatively. Any serous discharge, blood collection or break in incision line in the first three weeks of post-operative period was considered as wound infection.

Women undergoing emergency cesarean section during the study period and in labor for more than 6 hours after hospital admission, with or without rupture of membranes were included. The exclusion criteria were gestational diabetes mellliis, severe anemia (hemoglobin less than 7g/dl), placenta previa on USG, obstructed labor or any preoperative febrile condition.

After getting approval from the hospital ethical committee of Pakistan Institute of Medical Sciences, women were randomly allocated into two groups on their arrival in the operation theatre. Randomization was done by computer-generated numbers. No entry was made on the case notes regarding allocation. Resident doctor took informed consent from patients. Two hundred and seventeen patients were included in group A that received both vaginal and abdominal scrubbing while the same number of patients were included in group B who received only abdominal and vulval scrub. Patients were followed up for development of any of the defined infectious morbidities up to three weeks.

All the information was collected on specially designed Performa. Data was analyzed using SPSS version 10. Quantitative data like age and gestational age was presented as means and standard deviations. Qualitative variables like fever, endometritis and wound infection were measured as frequency and percentages. Chi-square test was applied to compare the morbidity in two groups. Effect modifiers like age, gestational age, parity, labor duration and PROM was controlled by stratification. Post stratification chi-square test was applied. A p-value of ≤ 0.05 was considered statistically significant.

Results

In our study, a total of 434 women were divided in two groups each having 217 clients. These women were in labor for the last six hours with or without ruptured membranes. Their age range was between 15-40 years. Mean age was 28.4 ± 4.6 years for group A and 27.6 ± 5.9 years for group B. The mean gestational age was 38.6 ± 1.2 weeks in group A and 38 ±1.3 weeks in group B.

Endometritis was noted in 1.4% women in group A and 8.8% in group B (p=0.000) with intact membranes (figure-1). The incidence of endometritis was higher when the duration of labor was more than 9 hours, 2.2% in group A and 37.2% in group B with p-value of 0.000. The incidence of endometritis was also higher with a history of PROM, it was 4.3% in group A and 19.4% in group B (p=0.014) which is also statistically significant.

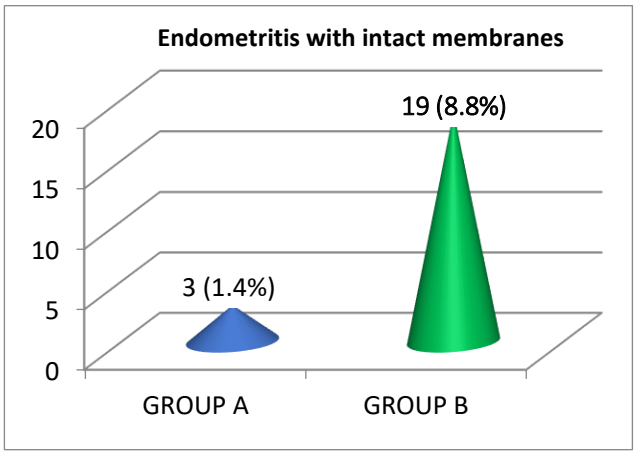

Figure 1. Comparison of post operative morbidity (Endometritis)

Fever was seen in 4.1% of women in group A and 7.4% in group B (p=0.149) which is not statistically significant. (Table I). On sub analysis, a significant correlation of fever was seen in women presenting with PROM with fever seen in 12.9% in group A and 51.6% in group B with p-value of 0.000. (figure-2).

Wound Infection occurred in 1.4% women in group A and 3.7% in group B (p=0.126) which was not significantly different in two groups. With a duration of the labor of 7-9 hours, the incidence of wound infection in group A was 1.8% and in group B it was 4%(p- value 0.209) which is also not significant. However, in patients with the history of PROM, the incidence of wound infection was 4.3% in group A and 22.6% in group B (p-value=0.004) which was statistically significant. (figure-3).

Table I: Post -operative morbidity			
Post op morbidity	**Group A(n=217)**	**Group B(n=217)**	**p-value**
Fever	9 (4.1%)	16 (7.4%)	0.149
Endometritis	3 (1.4%)	19 (8.8%)	0.000
Wound infection	3 (1.4%)	8 (3.7%)	0.126

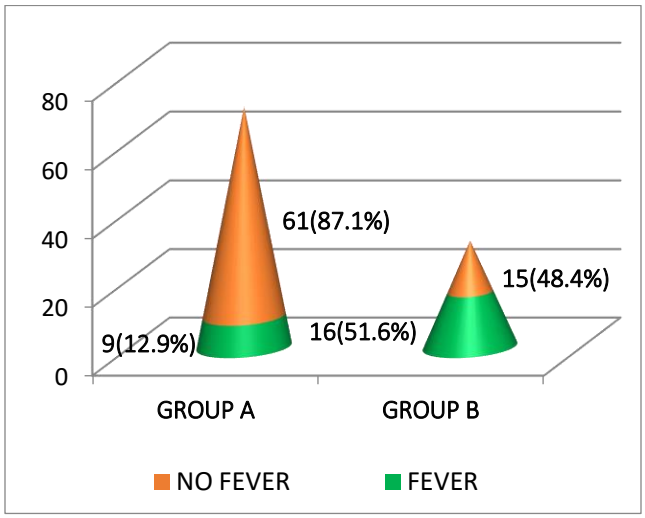

Figure 2. Fever and PROM

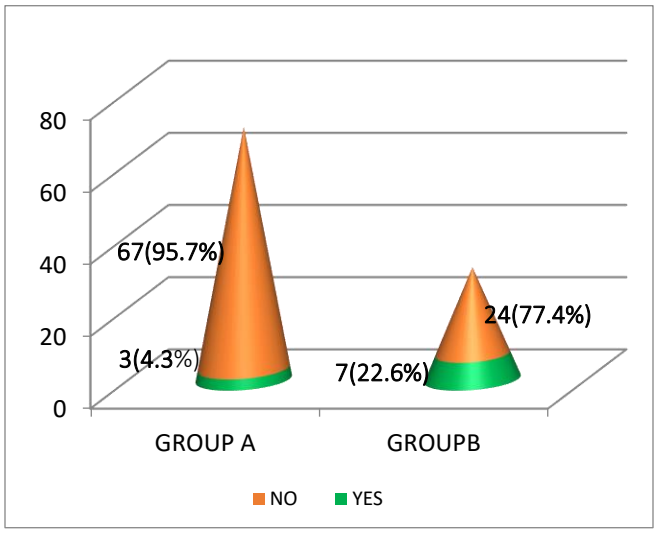

FIGURE 3: Wound infection and PROM

Discussion

The role of prophylactic parenteral antibiotics in decreasing the incidence of post-operative infections is well proven.[17] Still the infection rate after a caesarean delivery is quite high, particularly in emergency cesareans.[18] The increased post-operative infection is attributable mostly to multiple intra-partum vaginal examinations and prolonged rupture of membranes in emergency cesareans.[19]

In order to reduce post –operative infections various antiseptic solutions have been used for preoperative

vaginal cleansing in addition to prophylactic parenteral antibiotics. Rouse et al[20] used chlorhexidine for vaginal cleansing, whereas Pitt et al[21] used metronidazole vaginal preparations which showed a significant reduction in post cesarean endometritis. Povidone has also been used for this purpose in various studies and has shown varying results.[22]

Povidone iodine is an antiseptic solution which causes 98% reduction in the total number of bacteria in vagina with preoperative cleansing as reported by Osborne and Wright.[23] Vaginal cleansing with an antiseptic solution particularly povidone iodine before gynecological surgeries is in practice since 1970 and it has shown a reduction in post-operative infectious morbidity.[24] However, it is not a routine practice to do vaginal cleansing before cesarean delivery. So, we used povidone iodine for vaginal cleansing before emergency cesarean sections. It was a cheap, easy and practicable intervention. The cleansing solution was well tolerated by the patients with no increased allergic reactions or skin irritation.

The demographics of women undergoing cesarean section including the age of the patients and gestational age at delivery was similar in the two studied groups confirming appropriate selection ans randomization methods. Mean age of the patients was 28 years in our study whereas it was 31 years in a study by Fathia et al.[6] Mean gestational age was 38 weeks in both the groups whereas it was 36 weeks in Memon et al.[1]

The results of our study show that vaginal cleansing with povidone iodine resulted in a statistically significant reduction in post-operative composite infectious morbidities in women undergoing cesarean section in active labor. Our results are similar to those of Memon et al [1] and Guzman et al [22] who reported a reduced rate of post cesarean infections with preoperative vaginal cleansing with povidone iodine. However, a similar study by Reid et al [16] did not show a statistically significant difference in post cesarean infectious morbidities.

There are certain risk factors which increase the postoperative infectious morbidity in cesarean sections. These include prolonged labor, prolonged rupture of membranes and maternal anemia.[16] The association of prolonged labor and longer duration of rupture of membranes has also been consistent in our study with significant benefits resulting from vaginal cleansing.

Our study showed a statistically significant reduction in the incidence of post cesarean endometritis with pre-operative vaginal cleansing. Similar results have been reported by Cochrane review on preoperative vaginal cleaning with povidone iodine by Haas et al which showed reduction in post cesarean endometritis from 7.2 to 3.6 % and no significant difference on fever and wound infection which is inconsistency to the results of our study which showed reduction in endometritis from 8.8 to 1.4%.[25] However Dahlke et al reported no difference in infectious morbidity and endometritis of vaginal preparation to abdominal skin preparations with povidone iodine.[26]

The wound infection rate after cesarean section was 4.2 % in a study by Fathia et al [6] and 7.0% by Reid et al .[16] In our study, a trend towards reduction in wound infection was seen from 3.7 to 1.4 % by vaginal cleaning with povidone iodine although it was statistically not significant. Memon et al and Reid et al also found no statistically significant effect of vaginal cleansing on the incidence of wound infection.[1,16] However, in the sub analysis of women with prolonged rupture of membranes this reduction in wound infections from 22 to 4.2% became statistically significant (p-value=0.004) which was consistent with the results of Fathia et al which showed prolonged rupture of membranes as a risk factor for wound infection. [6]

Regarding febrile morbidity, some reduction from 7.4 to 4.1 % was seen but it was not statistically significant. Similar to wound infection reduction in febrile morbidity became significant in prolonged rupture of membranes. Fever was seen in 19.3 % of patients in the study by Reid et al [16] but statistically not significant. Our findings are consistent with the previous studies by Reid et al and Guzman et al [16,22] which demonstrated no significant difference in the rate of post-operative fever with the pre-operative vaginal cleansing.

In our study, on analyzing women with prolonged rupture of membranes, all the study indicators of postoperative infectious morbidity namely post-operative endometritis, fever and wound infection were significantly reduced with preoperative vaginal cleansing with povidone iodine.

Conclusion

Preoperative vaginal cleansing with povidone iodine in emergency cesarean sections decreased postpartum infectious morbidity due to endometritis. Women with prolonged labor and longer duration of rupture of membranes are at a greater risk of postoperative infectious morbidity and were shown to have the additional benefit of reduction of fever and wound

infection. It is a safe, cheap and well-tolerated intervention and should be used as an adjunct to abdominal cleaning and prophylactic antibiotics especially in low resource facilities.

References

1. National Institute of Population Studies. Pakistan Demographic and Health Survey 2006-2007. Preliminary Report. Islamabad: Ministry of Population Welfare.
2. Peterson HerbertB, Pollack ArmyE, Warshaw Jeffrey. Tubal sterilization. In Te Lindes's Operative Gynecology. 9th edition. Edited by: John A Rock, Howard W Jones, III. Philadelphia: Lippincott Williams & Wilkins; 2003:537-56.
3. Belaisch-Allart J, Mayenga JM, Castaing N, Allart JP. Is tubal and uterine surgery deleterious to ovarian reserve? Gynecol Obstet Fertil 2006;34:1111-7.
4. Carmona F, Cristobal P, Casamitjana R, Balasch J. Effect of tubal sterilization on ovarian follicular reserve and function. Am J Obstet Gynecol 2003; 447-52.
5. Kelekci S, Yilmaz B, Yasar L, Savan K, Sonmez S, Kart C. Ovarian reserve and ovarian stromal blood supply after tubal ligation by the Pomeroy technique: comparison with controls. Gynecol Endocrinol 2005;20:279-83.
6. Dede FS, Dilbaz B, Akyuz O, Caliskan E, Kurtaran V, Dilbaz S. Changes in menstrual pattern and ovarian function following bipolar electrocauterization of the fallopian tubes for voluntary surgical contraception. Contraception 2006;73:88-91.
7. Kelekci S, Yorgancioglu Z, Yilmaz B, Yasar L, Savan K, Sonmez S. Effect of tubal ligation on ovarian reserve and the ovarian stromal blood supply. Aust N Z Obstet Gynaecol 2004;44:449-51
8. Peterson HB, Jeng G, Folger SG, Hillis SA, Marchbanks PA, Wilcox LS: The risk of menstrual abnormalities after tubal sterilization. N Engl J Med 2000; 343:1681–87.
9. Westhoff C, Davis A. Tubal sterilization: focus on the US experience. Fertil Steril 2000; 73:913–22.
10. Harlow BI, Missmer SA, Cramer DW, Barbieri RL. Does tubal sterilization influence the subsequent risk of menorrhagia or dymenorrhea? Fertil Steril 2002; 77:754–60.
11. Cattanach JF, Milne BJ. Post-tubal sterilization problems correlate with ovarian steroidogenesis. Contraception 1988; 38:541–50.
12. Orshan SA, Furniss KK, Forst C, Santoro N. The lived experience of premature ovarian failure. J Obstet Gynecol Neonatal Nurs 2001; 30:202–8.
13. McKinlay SM, Brambilla DJ, Posner JG: The normal menopause transition. Maturitas 1992; 14:103–15.
14. Peterson HB, Jeng G, Folger SG, Hillis SA, Marchbanks PA, Wilco. The risk of menstrual abnormalities after tubal sterilization. *N Engl J Med* 2000 , 343(23):1681-7.
15. Gentile GP, Kaufman SC, Helbig DW. Is there any evidence for a post-tubal sterilization syndrome? *Fertil Steril* 1998; 69(2): 179-86.
16. Harlow BernardL, Stacey A, Missmer , Daniel W, Gramer , Barbieri RobertL: Dose tubal sterilization influence the subsequent risk of menorrhagia or dymenorrhea? *Fertil Steril* 2002; 77(4):754-60.
17. Shain RN, Miller WB, Mitchell GW, Holden AE, Rosenthat M. Menstrual pattern change 1 year after sterilization: resultes of a controlled, prospective study. *Fertil Steril* 1989 ; 52(2):192-203.
18. Cattanach JF, Milan BJ. Post-tubal sterilization problems corrected with ovarian steroidogenesis. *Contraception* 1988, 38(5):541-50.
19. Buytaert P, Viaene P. laparoscopic tubal sterilization: Postoperative follow-up a late gynecological complaints. *Eur J Obstet Gynecol Reprod Biol* 1980; 10(2):119-24.
20. Peterson Herbert B, Pollack Army E, Warshaw Jeffrey S. Tubal sterilization. In *Te Lindes's Operative Gynecology*. 9th edition. Edited by: John A Rock, Howard W Jones, III. Philadelphia: Lippincott Williams & Wilkins; 2003:537-56.
21. Gentile GP, Kaufman SC, Helbig DW. Is there any evidence for a posttubal sterilization syndrome? Fertil Steril 1998;69:179-86.
22. Cattanach JF, Milne BJ. Post-tubal sterilization problems correlated with ovarian steroidogenesis. Contraception 1988;38:541-50.
23. Wilcox LS, Martinez-Schnell B, Peterson HB, Ware JH, Hughes JM. Menstrual function after tubal sterilization. Am J Epidemiol 1992;135: 1368-81.
24. Dede FS, Dilbaz B, Akyuz O, Caliskan E, Kurtaran V, Dilbaz S. Changes in menstrual pattern and ovarian function following bipolar electrocauterization of the fallopian tubes for voluntary surgical contraception. Contraception 2006;73:88-91.
25. Fagundes ML, Mendes MC, Patta MC, Rodrigues R, Berezowski AT, de Moura MD, et al. Hormonal assessment of women submitted to tubal ligation. Contraception 2005 ;71:309- 14.
26. Cevrioglu AS, Degirmenci B, Acar M, Yilmazer M, Erol D, Kahraman A, et al. Examination of changes caused by tubal sterilization in ovarian hormone secretion and uterine and ovarian artery blood flow rates. Contraception 2004; 70: 467-73.
27. Kelekci S, Yilmaz B, Yasar L. Ovarian reserve and ovarian stromal blood supply after tubal ligation by the Pomeroy technique: Comparison with controls. Gynaecol Endocrinol 2005;20:279-83.
28. Ashfaq G, Kakar F, Ahmed M. Association of tubal ligation or abdominal surgery with other gynaecological illness. Pakistan J Med Res Dec 2005;44:152-5.
29. Umber F, Rizvi S, Yusuf WA. Dysfunctional uterine bleeding-association with bilateral tubal ligation? Ann KE Med Coll 2006;12:515-6.