Original Article

Effect of preoperative vaginal cleansing with an antiseptic solution to reduce post caesarean infectious morbidity

Shahneela Memon, Roshan Ara Qazi, Seema Bibi, Naheed Parveen
Department of Obstetrics & Gynaecology, Liaquat University of Medical & Health Sciences, Jamshoro, Pakistan.

Abstract

Objective: To determine the effectiveness of pre operative vaginal cleansing with an antiseptic solution to reduce post caesarean infectious morbidity.

Methods: An observational case control study was conducted at Department of Obstetrics and Gynaecology, Unit-III, Liaquat University Hospital, Hyderabad from February to July 2010. The 100 women in control group received the standard abdominal preparation only, while the 100 subjects in interventional group also received preoperative vaginal cleansing with 10% pyodine along with the usual abdominal scrub. All subjects received prophylactic antibiotic cover during the surgery. Maternal demographics, surgical parameters and infectious outcome were collected and data compiled on a pre-designed proforma and analysis was done using SPSS 15.

Results: The comparison between two groups did not show a significant difference in patient's demographics, labour and surgical variables. Post caesarean endometritis occurred in 1% of case group and 7% of controls (p value: <0.03). There was no measurable effect seen on development of fever and wound infection. However, statistically significant reduction in overall composite morbidity i.e. p value: <0.02 and odds ratio 0.335 (CI =0.125-0.896) was seen in patients with vaginal cleansing group when compared with controls.

Conclusion: Preoperative vaginal cleansing with pyodine has reduced post caesarean infectious morbidities.

Keywords: Post operative infection, Vaginal cleansing, Caesarean section, Endometritis (JPMA 61: 1179; 2011).

Introduction

Caesarean section is one of the most frequently performed surgical procedure by the Obstetricians and currently accounts for approximately 29.1% of deliveries in United States[1] and 21.5% in England.[2] The rate of caesarean section in Pakistan ranged from 21-40% reported in the small hospital based studies.[3-5] Despite the wide spread use of prophylactic antibiotics, post operative infection remains a significant complication of caesarean delivery. These complications included endometritis, maternal fever, wound infection and pelvic abscess.[6] Endometritis, is an infection of uterus in the post partum period complicates 6-27% of the cases.[7,8] This complication is about 10 times more common when compared with vaginal delivery and can lead to bacteraemia, peritonitis, intra abdominal abscess and

sepsis.[9,10] Other maternal infections like fever and wound complications (including seroma, haematoma, infection and breakdown of surgical incision), occurs in 5-24% and 2-9% respectively.[11] Maternal mortality from these complications is rare, with an incidence of 6 deaths per 100,000 caesarean deliveries,[12] but it may increase the personal and economic burden and can also lead to pain and discomfort, prolonged hospital stay, anxiety and readmission to hospital.[13] The most recognized risk factors for developing post caesarean infectious morbidity included repeated vaginal examinations, prolonged rupture of membranes, prolonged labour and failure to use prophylactic antibiotics.[14] Other reported risk factors are nulliparity, younger age, and use of internal monitors in labour, intra partum bacterial vaginosis and presence of immuno-compromised state such as diabetes mellitus, anaemia or obesity.[15,16] The causal microorganisms (mostly polymicrobial) ascend from vagina and cervix into the uterus with haematogenous spread through exposed edge of incised myometrium. These bacteria are also responsible for resistance to prophylactic antibiotics.[17] Cleansing of all body surfaces that could be in contact during a surgical procedure tends to minimize the presence of micro-organisms and risk of infection. Various studies have been done to evaluate whether vaginal cleansing before a caesarean delivery with an antiseptic solution can reduce the incidence of post operative infection.[6,8,14,18,19] Povidone iodine, chlorhexidine and vaginal metronidazole use have been reported for this purpose. Povidone iodine used more frequently had varying results,[6,8,14] whereas no reduction in endometritis was seen with the use of chlorhexidine,[18] while use of vaginal metronidazole showed a reduction in endometritis but the study was limited by small sample size,[19] however very few side effects have been reported with the use of Povidone iodine and chlorhexidine.

The objective of the study was to determine the effectiveness of pre-operative cleansing of vagina with an antiseptic solution (10% Povidone iodine) in reducing the post caesarean infectious morbidities. The rationale is to give recommendations to health care providers for designing local guidelines regarding the management of caesarean deliveries in special context to Pakistani population

Patients and Methods

This case control study was carried out at Department of Obstetrics and Gynaecology Unit-III, Liaquat University Hospital Hyderabad, Pakistan, from February 2010 to July 2010. All pregnant women who were to undergo caesarean section over age 18 years and able to give informed consent were included in the study. Exclusion criteria were allergy to iodine containing solutions and bleeding placenta previa. Upon making the decision for caesarean delivery, consent was obtained by the resident doctor for procedure and study. Women were randomly assigned to the control or interventional group. Upon arrival to operation theatre and after adequate anaesthaesia, all patients were catheterized with Foley's catheter in sterile manner. The interventional group received a Povidone iodine vaginal cleansing along with the usual abdominal scrub. Vaginal cleansing was done with 3 gauze pieces soaked with 10% pyodine in a sterilized bowl and the scrub was done from the vaginal apex to the introitus with attention to the anterior, posterior and lateral vaginal wall. After vaginal cleansing the gloves were changed to perform the abdominal scrub. The vaginal wash even with tap water was not done in the women of control group as no vaginal cleansing was a criterion for the study in this group; however the standard surgical preparation of abdomen was done in a usual manner. The lower segment caesarean section was then performed. All women received the prophylactic antibiotics usually a third generation cephalosporin during the surgery. All participants received the routine post operative care without other intervention. Maternal and infant demographic details were recorded along with the indication of caesarean section, duration of labour and length of rupture of membranes as well as other surgical parameters. At the time of hospital discharge and again at one month post partum, data were extracted from the hospital files and transferred to a pre-designed questionnaire. Operational definitions for principal outcome were established before reviewing the data. Post operative febrile morbidity was defined as oral temperature of 38ºC and greater after first 24 hours of surgery. Endometritis was defined as post operative fever of 38.4ºC and greater, with uterine tenderness and foul smelling lochia requiring broad spectrum intravenous antibiotic administration. Wound complications were defined as infection at surgical site (seroma, haematoma, and disruption of the abdominal incision) that requires parenteral antibiotics and wound care. Patients who came with post operative wound infection in out patient department were readmitted to the hospital for initiation of intravenous antibiotic therapy and wound care. Data were collected from their hospital charts. Additionally patient's record was reviewed for the presence of other risk factors like anaemia and diabetes mellitus. Measurement bias was minimal because the physician who evaluated the data were unaware of any patient's participation in the study. All data were entered and analyzed by using SPSS software version 15.

Results

Of the 200 women, who entered the study, 100 were allocated to the control group and 100 to the vaginal cleansing group. Comparison of the control group to the intervention group did not show a significant difference in patient demographics, labour, surgical variables and maternal co-morbid conditions (Table-1). The mean age of the subjects was 27.1±4.7, the mean gestational age at

Table-1: Demographic, labour and surgical characteristics of the subjects in the study.

Variable	Control (n=100)	Cases (n=100)
Mean age in years	27.09± 4.55	27.2 ± 4.96
Mean parity	2.51± 2.27	2.4 ± 2.25
Mean gestational age at delivery in weeks	36.86± 2.46	36.65± 2.05
Primary caesarean delivery (n=%)	30 (30)	35 (35)
Patient in labour (n=%)	38 (38)	31 (31)
Mean length of labour after admission in hours	4.03 ± 6.41	2.46 ± 5.98
Cervical dilatation at time of c-section (n=%)	40 (40)	26 (26)
Membranes ruptured at the of c-section (n=%)	33 (33)	25 (25)
Mean length of rupture of membranes in hours	2.84 ± 8.12	2.50± 8.10
Chorioamnionitis (n=%)	6 (6)	4 (4)
Mean number of pelvic examinations before delivery	1.35± 0.64	1.56 ± 0.79
Vaginal hand needed for delivery of baby (n=%)	6 (6)	4 (4)
Mean pre operative haemoglobin; g/dl	9.87± 1.78	10.07 ± 1.99
Mean estimated blood loss in ml	654.5± 103.4	646.5 ± 113.3
Mean surgical time in minutes	53.33 ± 14.46	48.85± 11.47
Mean hospital stay in days	4.72± 2.36	4.57 ± 4.37
Mean baby birth weight in kg	2.64 ± 0.52	2.72 ± 0.45

Data are given as percentages or mean ± standard deviation (SD).

Table-2: Post caesarean infectious morbidities by allocation group.

Variable	Controls (n=100)	Cases (n=100)	P. value	RR (CI 95%)
Composite infectious morbidity overall	16 (16%)	6 (6%)	0.02	0.335 (0.125-0.896)
Endometritis	7 (7%)	1 (1%)	0.03	0.134 (0.016-1.112)
Fever	6 (6%)	4 (4%)	0.51	0.653 (0.178-2.387)
Wound infection	3 (3%)	1 (%)	0.31	0.327 (0.033-3.194)

delivery was 36.7±2.2 weeks.

An analysis of various risk factors was done to find out their difference with the composite infectious morbidity. Sixty nine (34.5%) women were in labour at the time of caesarean section. Out of them, 6 (8.6%) in control group and 1 (1.4%) in cases developed composite morbidity (p=0.2). Cervix was dilated in 66 (33%) subjects. Six (9.0%) and 1 (1.5%) developed infection in controls and cases respectively (p=0.4). Fifty eight (29%) presented with ruptured membranes and 5 (8.6%) in control group and 1 (1.7%) in interventional group had post operative infectious morbidity (p=0.2). Although, these factors did not show statistically significant reduction in post operative morbidity, but their incidence was decreased in vaginal cleansing group. Only 65 (32.5%) women has undergone primary caesarean section. Out of them, 8 (12.3%) in control group and 4 (6.1%) in cases developed infections, which was statistically significant (p=0.01). The risk of developing post caesarean morbidity was significantly increased in association with maternal anaemia (10.02±1.75; p= 0.004) and length of surgery (49.70 ±11.4; p=0.001).

Pre-operative vaginal cleansing with pyodine has shown a statistically significant reduction in the incidence of composite infectious morbidities (p < .02) and particularly in patients who were in active labour at the time of caesarean delivery (Table-2). More marked reduction was seen in frequency of post operative endometritis (p <.03) which was most pronounced for women with ruptured membranes. Four women (4%) in the vaginal cleansing group and 6 (6%) in the control group had febrile morbidity. Only one (1%) patient in intervention group developed wound infection, while 3 (3%) in control group were readmitted to the hospital due to wound complications. They were treated with broad spectrum intravenous antibiotics and resuturing of open abdominal wound was done in two cases.

Discussion

Vaginal cleansing with an antiseptic solution before vaginal surgery or abdominal hysterectomy is practiced since 1970 and it has shown a reduction in post operative infectious morbidity.[20] Osborne and Wright[21] reported a reduction in the total number of bacteria in vagina by at least 98% with the preoperative vaginal cleansing with Povidone iodine.

Literature review demonstrated well the effectiveness of prophylactic parenteral antibiotics in reducing the rate of post operative infections.[22,23] Despite its use, infectious morbidity after a caesarean delivery remains significant.[17,24] Use of other antiseptic solutions for preoperative vaginal cleansing has also been reported. Rose et al[18] used chlorhexidine for vaginal scrub, whereas Pitt et al[19] tried intravaginal metronidazole which showed significant

reduction in post caesarean endometritis. Povidone iodine has also been used for this purpose in various studies[6,8,14] and it showed varying results. We also did the same intervention and used 10% pyodine before surgery. This intervention is safe, inexpensive and can easily be performed at the same time when Foley's catheter is inserted. This effect is quick, occurring within ten minutes, making it of great use before performing a caesarean section.[25]

In our study, vaginal cleansing with 10% pyodine has shown a statistically significant reduction in post operative composite infectious morbidities. This reduction appeared to be more marked for women undergoing caesarean section with active labour. Our findings are similar to those of Guzman et al[8] who reported a reduced rate of post caesarean infections. Same studies have been done by David et al and Reid et al[6,13] but they did not show a statistically significant difference in post caesarean infectious morbidities.

Various risk factors for developing post caesarean endometritis have been recognized which include cervical dilatation at the time of caesarean section, prolonged labour, prolonged rupture of membranes and maternal anaemia.[13,14] The association of being in active labour and longer duration of rupture of membranes has also been consistent in our study. Our study showed a statistically significant reduction in the incidence of post caesarean endometritis. The same has been reported in a study by Rosally et al.[14] Most of the women who developed post operative infectious morbidity had presented with failed trial of labour by some midwives, being in labour for 48 hours or more and with ruptured membranes. They had a history of repeated vaginal examinations which is again a source of ascending infection form the vagina. Other risk factors were also reported like being unbooked, anaemic and belonging to poor socio-economic class. So even with the broad spectrum antibiotics and preoperative vaginal cleansing with pyodine, they developed morbidities. Health education regarding planned pregnancy, antenatal care and intra partum care could facilitate interventions like in our study.

In our study, 4 subjects had wound infection, 1 in cleansing group and 3 in the control group. Out of these 4 patients, 2 in the control group needed readmission, wound care, parenteral antibiotics and resuturing of abdominal wound. This could be due to the sub acute presence of bacteria, which contribute to wound separation before obvious signs of infection develop. Additionally, these women suffered most in post partum period, and had a longer hospital stay, discomfort, anxiety and increased economic burden for the family. Although no significant reduction in the rate of wound infection was noted with the use of vaginal irrigation with pyodine, which is almost similar to other reported studies,[6,13] but care should be taken while interpreting the results as only one woman in cleansing group developed wound infection in immediate post operative period that required parenteral antibiotics and wound care as compared to the control group where two women needed readmission, resuturing of wound along with antibiotics.

Regarding febrile morbidity, our findings are consistent with the previous studies (Reid et al, Guzman, Haas et al)[6,9,13] which demonstrate no significant difference in the rate of post operative fever with the intervention, however associated risk factors have already been discussed and reported to have a role in development of fever. The solution was well tolerated by the patients with no increased allergic reactions or skin irritation.

Within our study population, this intervention demonstrates a benefit of reducing the rate of post caesarean infectious morbidity, which is statistically significant. The incidence of post caesarean endometritis was significantly reduced in the intervention group, when compared with the control group particularly in patients who were in active labour and with ruptured membranes.

Vaginal cleansing is a safe, rapid, cheap and well tolerated intervention, and should be used as an adjunct to prophylactic antibiotics immediately before caesarean section to reduce the bacterial exposure of the endometrium and other maternal tissues during caesarean section. Adequately powered randomized trials should be done to determine this benefit before a change in practice in implemented.

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