

Preoperative vaginal wash with povidone iodine solution to reduce post caesarean infectious morbidity

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Abstract:

Background: Post-operative infection is frequently seen in Caesarean section. Vaginal wash with 10% povidone iodine & Antibiotic prophylaxis may have significant impact in reduction of infections and thus the need to study their roles in sepsis prevention systematically.

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

Setting: It was carried out in Al Zahra' a teaching Hospital, Najaf city from February to October 2013.

Methods: An observational case control study was conducted at Department of Obstetrics and Gynecology, Unit-Al Zahra 'a Hospital, The 150 women in control group received the standard abdominal preparation only, while the 150. subjects in interventional group also received preoperative vaginal cleansing with 10% povidone iodine 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 20.

Results: The result of our study which consist of 150 patients with wash and antibiotic and other group which consist of 150 patients with antibiotic only shows no significant difference between the two groups regarding wound infection or fever or endometritis with ($P>0.05$) in spite of there is decrease in the number of patients complaining from these complication in the second group(wash+antibiotic)

Conclusion: The percentage of patients who had infectious morbidity after caesarian section may be decreased by using wash+antibiotic despite that antibiotic only is also effective.

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 and 21.5% in England(1) The rate of caesarean section in Iraq may reach 50% or more as reported by the Iraqi health minister(2).

Despite the wide spread use of prophylactic antibiotics, post-operative infection remains a significant complication of caesarean delivery(3).These complications included endometritis, maternal fever, wound infection and pelvic abscess. Endometritis, is an infection of uterus in the post partum period complicates 6-27% of the cases.(4)

This complication is about 10 times more common when compared with vaginal delivery and can lead to:

- bacteraemia, peritonitis, intra abdominal abscess and sepsis.
- Other maternal infections like fever and wound complications (including seroma, hematomas, infection and breakdown of surgical incision), occurs in 5-24% and 2-9% respectively(4).

Infection is defined by identification of microorganisms in the host tissue or the blood stream, plus an inflammatory response to their presence. At the site of infection the classic findings of rubor, calor, and dolor in areas such as the skin or subcutaneous tissue are common. Most infections in normal individuals with intact host defenses are associated with these local manifestations, plus systemic manifestations such as elevated temperature, tachycardia, or tachypnea. The systemic manifestations noted above comprise the systemic inflammatory response syndrome (SIRS) (5).

SIRS can be caused by a variety of disease processes, including pancreatitis, polytrauma, malignancy, and transfusion reaction, as well as infection. Strict criteria for SIRS (tachycardia, tachypnea, fever, and elevated WBC count) recently have been broadened to include additional clinical indicators. SIRS caused by infection is termed sepsis, and is mediated by the production of a cascade of proinflammatory mediators produced in response to exposure to microbial products. These products include lipopolysaccharide (endotoxin, LPS) derived from gram-negative organisms; peptidoglycans and teichoic acids from gram-positive organisms; multiple cell wall components such as mannin from yeast and fungi; and many other. Patients have developed sepsis if they have met clinical criteria for SIRS and have evidence of a local or systemic source of infection (6).

SSIs are classified into incisional and organ/space infections, and the former are further sub classified into superficial (limited to skin and subcutaneous tissue) and deep incisional categories (7).

The development of SSIs is related to three factors:

1. the degree of microbial contamination of the wound during surgery
2. the duration of the procedure
3. host factors such as diabetes, malnutrition, obesity, immune suppression, and a number of other underlying disease states.

By definition, an incisional SSI has occurred if a surgical wound drains purulent material or if the surgeon judges it to be infected and opens it. Surgical Site Infections are infections of the tissues, organs, or spaces exposed by surgeons during performance of an invasive procedure (operative wound)

Risk factor for developing systemic site infection:.

1- patient factor:

Old age, immunosuppression, obesity, diabetes mellitus, chronic inflammatory process, malnutrition, peripheral vascular disease, anemia, radiation, chronic skin disease, carrier state (e.g. chronic staphylococcus carriage) and recent operation.

2- Local factor:

Poor skin preparation, contamination of instrument, inadequate antibiotic prophylaxis, prolonged procedure, local tissue necrosis, hypoxia and hypothermia.

3- microbial factor:

Prolong hospitalization (leading to nosocomial organisms), toxin secretion and resistance to clearances (e.g. capsule formation).

Other reported risk factor:

□ null parity, younger age, use of internal monitors in labor, intra partum bacterial vaginosis, presence of immuno-compromised state such as diabetes mellitus, anemia or obesity.(7)

Patients and Method

This case control study was carried out at Obstetrics and Gynecology Department - Al Zahra' a Hospital, Najaf city from February to October 2013.

After exclusion of ante partum hemorrhage, diabetics & immune suppressed and patients with chorioamnionitis, women were randomly assigned to the control or interventional group, the average age of both groups 24.9 ± 4.8 year, their gestational age (wk) 38 ± 1.2 , their average body mass index (kg/m^2) 28.3 ± 4.5 , their average duration of operation 50mt.

Upon arrival to operation theatre and after adequate anesthesia, all patients were catheterized with Foley's catheter in a sterile manner. The interventional group received a Povidone iodine vaginal cleansing along with the usual abdominal scrub. Vaginal cleansing was done with gauze sponges soaked in 10% Povidone- iodine solution rotated 360 degrees for 30 second from vault to introitus.

After vaginal cleansing the gloves were changed to perform the abdominal scrub, however the standard surgical preparation of abdomen was done in a usual manner for both groups. The lower segment.

caesarean section was then performed. All women received the prophylactic antibiotics usually (metronidazole & ceftriaxone) in the operating room.

All participants received the routine postoperative care without other intervention. Maternal and infant demographic details were recorded along with the indication of caesarean section, duration of labor and length of rupture of membranes as well as other surgical parameters. At the time of hospital discharge and followed

within 10 days post-partum, data were extracted from the hospital files and transferred to a pre- designed questionnaire. Post-operative febrile morbidity was defined as oral-temperature of 38°C and greater after first 24 hours of surgery. Endometritis was defined as post-operative fever of 38.4°C 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, hematoma, and disruption of the abdominal incision) that requires parenteral antibiotics and wound care . (19) Patients who came with post-operative wound infection in outpatient

department were readmitted to the hospital for initiation of intravenous antibiotic therapy and wound care.

Additionally patient's record was reviewed for the presence of other risk factors like anemia and obesity. 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 soft.wa.re version 20.

Result:

The result of our study consist of 300 women, half of them give them antibiotic only while the other half we use vaginal wash and antibiotic . the demographic data of the two groups had been shown in table 1

Table (1) comparison between two groups regarding certain parameters

Parameter	Wash+antibiotic	Antibiotic only	P.value
	Mean ±SD	Mean±SD	
Age (years)	24.52±4.97203	25.2667±4.72132	0.183
Gravid	2.4±1.2	2.36±1.44	0.585
Hb(mg/dl)	11.1±1.2	11.05±1.4	0.639
GA(weeks)	38.58±1.09	38.6±1.07	0.873
BMI(kg/m2)	27.966±4.2	28.06±4.819	0.848
Duration of operation(minutes)	44±6	43±8	0.784

There is no significant difference between two groups in all parameters

Table (2) relation between two groups regarding RM

		Group		P.value
		Wash +antibiotic	Antibiotic only	
No. of patients with RM	Yes	58(38.67%)	61(40.67%)	0.723
	No	92(61.33%)	89(59.33%)	

Table(3) relation between two groups regarding MASF

		Group		p.value
		Wash +antibiotic	Antibiotic only	
No. of patients with MSAF	Yes	17(11.33%)	15(10%)	0.708
	No	133(88.6%)	135(90%)	

Table(4) relation between two groups regarding fever.

		Group		p.value
		Wash +antibiotic	Antibiotic only	
No. of patient with fever	Yes	3(2%)	5(3.3%)	0.474
	No	147(98%)	145(96.6%)	

Table(5) relation between two groups regarding endometritis.

		Group		p.value
		Wash +antibiotic	Antibiotic only	
No. of patients with Endometritis	Yes	1(0.66%)	3(2%)	0-314
	No	149(99.3%)	147(98%)	

Table(6) relation between two groups regarding wound infection

		Group		p.value
		Wash +antibiotic	Antibiotic only	
No. of patients with Wound infection	Yes	4(2.67%)	8(5.33%)	0.239
	No	146(97.3%)	142(94.67%)	
Total	150(100%)	150(100%)		

Table (7) Relation between different presentations with different parameters.

Parameters	Age	Gravid	Hb	GA	BMI	RM	Me
	Mean+SD	Mean+SD	Mean+SD	Mean+SD	Mean+SD	No	No
Fever(8)	24.5±5	2±1	10.4±0.9	38.75±0.7	28.25±4.1	4	2
Endometritis(4)	24.25±6	2±1	11.12±1.3	38.5±0.57	26.25±4.34	2	0
Wound infection(12)	25.6±4.8	2±1	11.46±1.1	38.5±0.9	26.75±6.4	5	3

This Table Relation between different presentations with different parameters which reveal total number of patient who developed fever was (8),(4) patients present with rupture membrane and (2) patients present with meconium stained amniotic fluid. The total number of patient who developed endometrites was(4), (2) patients present with rupture membrane . the total number of patient who developed wound infection was (12), (5) of them had rupture membrane while the other three had meconium stained amniotic fluid.

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. Osborne and Wright reported a reduction in the total number of bacteria in vagina by at least 98% with the preoperative vaginal cleansing with Povidone iodine(21). Our study demonstrated the effectiveness of preoperative vaginal cleansing with povidone-iodine and prophylactic parental antibiotic in reducing the rate of post-operative infection .despite its use, infectious morbidity after c/s remains significant(22). In this study we use Povidone-iodine which is safe, inexpensive, can easily be performed at same time when folly's catheter is inserted .this effect is quick, occurring within 10 minutes ,making it of great use before performing c/s.(23)

In Our study ,we found the total number of patient which develop fever as a complication after c/s in interventional group was 3 (2%)while number of patient with fever after c/s in control group was 5(3.3%) and p.value (0.474) .also we found the total number of patients which developed endometrites as a complication after c/s in interventional group was 1 (0.66%)while number of patient with endometrites after c/s in control group was3(2%). And p.value (0.314)the total number of patients which developed wound infection after c/s in interventional group was 4(2.67%) ,while total number of patients which developed wound infection after c/s in control group was 8(5.33%)and p.value (0.239).

All these results means preoperative vaginal wash with antibiotic decrease the rate of post c/s infectious morbidity but these results statistically not significant and there is difference & decrease in number of complications probably we may relate these findings to the low number of patients. another study which done by Asghanin which involve 568 women 284 receive antibiotic +preoperative vaginal wash as interventional group and another 284 women receive antibiotic only as control group in which no. of patient was develop fever in interventional group 14(4.9%) while no. of patient which developed fever in control group 17(5.9%)and p.value (0.579).

No. of patient which develop endometritis in interventional group was 1(0.35%)and no. of patient which develop endometritis in control group was 7(2.4%) and p.value (0.033).

No. of patient which develop wound infection in interventional group was 4(3.3%)while No. of patient which develop wound infection in control group was 9(3.1%)and p.value(0.815).(16)

Another study which done by Haas which involve 300 women,155(vaginal wash+antibiotic) as interventional group and 145 women only receive antibiotic only as control group .No .of patient which developed fever was in interventional group 2(1.3%)while No. of patient which develop fever in control group was 7(4.8%) p.value (0.073).No. of patient which develop endometritis in interventional group was zero (0%) while No. of patient which develop endometritis in control group was 4(2.7%) p.value (0.037).No. of patient which develop wound infection in interventional group was 7(4.5%)while No. of patient which develop wound infection was 10(6.9%) and p.value(0.373) (25)

Another study which done by Starr which involve 400 women,144women receive antibiotic +vaginal wash as interventional group and 166women receive antibiotic only as control group .so, No. of patient which

develop fever in interventional group was 34(23.6%) while No. of patient which develop fever in control group was 47(28.3%) and p. value(0.346).

No. of patient which develop endometritis in interventional group was 10(6.9%) while No. of patient which develop endometritis in control group was 24(14.45%) and p. value (0.035).

No. of patient which developed wound infection in interventional group was 1(0.69%) while No. of patient which develop wound infection in control group was 2(1.2%) and p.value(0.647).(26)

In all three studies there are reduction in all postoperative complication in interventional group but only result of endometritis was show statistically significant and p.value was less than 0.05 but with other complication did not show statistically not significant.

Our findings are similar to those of David *et al* & Ried *et al* .(3) Which they did not show a statistically significant difference in post c/s infectious morbidity .Another study which done by Guzman *et al* (27) who reported reduced rate of post c/s infection but they show there is statistically significant difference in post c/s infectious morbidity .

Various risk factors for developing post caesarean endometritis have been recognized which include cervical dilatation at the time of caesarean section, prolonged labor, prolonged.

rupture of membranes and maternal anemia .The association of being in active labor and longer duration of rupture of membranes has also been consistent in our study.

Our study showed a statistically not significant reduction in the incidence of post caesarean endometritis .another study by Rosally *et al* which demonstrated statistically significant reduction in post cls endometritis. Most of the women who developed post-operative infectious morbidity had presented with failed trial of labor by some mid wives, being in labor 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, anemic and belonging to poor socioeconomic class. So even with the broad spectrum antibiotics and preoperative vaginal cleansing with povidon-iodin, they developed morbidities.

In our study, 12 subjects had wound infection, 4 in cleansing group and 8 in the control group. Out of these 12 patients, 3 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 povidon-iodin, which is almost similar to other reported studies, but care should be taken while interpreting the results as 4 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 3 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*) which demonstrate no significant difference in the rate of post-operative fever with the intervention. The solution was well tolerated by the patients with

no increased allergic reactions or skin irritation.

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.

Conclusion:

In our study we found the use of antibiotic with preoperative vaginal wash with povidon iodine solution decrease number of patient which present with post-operative infectious morbidity but there is statically not significant and this may be due to small size of patient that include study.

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