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Dr. Shameem Nihar
Post Graduate-Final Year Student, Department of Obstetrics and Gynaecology - Trichy SRM Medical College Hospital & Research Centre, Tiruchirappalli, Tamil Nadu, India

Dr. Sukanya Mukherjee
Associate Professor, Department of Obstetrics and Gynaecology - Trichy SRM Medical College Hospital & Research centre, Tiruchirappalli, Tamil Nadu, India

Dr. Shaik Salma
Assistant Professor, Department of Obstetrics and Gynaecology - Trichy SRM Medical College Hospital & Research Centre, Tiruchirappalli, Tamil Nadu, India

Dr. Revwathy
Professor of OG & Dean, Department of Obstetrics and Gynaecology - Trichy SRM Medical College Hospital & Research Centre, Tiruchirappalli, Tamil Nadu, India

Dr. Sankareswari
Professor and HOD, Department of Obstetrics and Gynaecology - Trichy SRM Medical College Hospital & Research Centre, Tiruchirappalli, Tamil Nadu, India

Corresponding Author:
Dr. Shameem Nihar
Post Graduate-Final Year Student, Department of Obstetrics and Gynaecology - Trichy SRM Medical College Hospital & Research Centre, Tiruchirappalli, Tamil Nadu, India

Effectiveness of inclusion of chlorhexidine cleansing in pre-operative preparation of C-Section in reducing postpartum endometritis: A comparative study in tertiary care institute

Dr. Shameem Nihar, Dr. Sukanya Mukherjee, Dr. Shaik Salma, Dr. Revwathy and Dr. Sankareswari

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Abstract
Background: Infectious morbidity is one of the commonest cause, contributing to almost 15% of maternal mortality. Vaginal cleansing with 1% chlorhexidine solution before C section can be an economical and affordable source of infection control.
Aim: To evaluate the effect of vaginal chlorhexidene cleansing before C-section and its role in reduction of postpartum genital tract infections.
Objective: To include 1% chlorhexidine cleansing as a routine procedure pre-operatively in all C-sections.
Methods: 50 AN patients taken for C- section during the study period(01.12.2020 to 06.06.2021) in TSRMMCH&RC were divided into two groups A and B. Group A –taken as control group was given the routine pre-operative skin preparation ,medications and prophylactic antibiotics. Group –B was the interventional group in which patients in addition were given vaginal cleansing with0.5% chlorhexidene for 30 seconds before and after catheterisation with 2 separate swab sticks.
Inclusion Criteria: 1) All women undergoing C section. 2) Those who give willingness to participate in study and for follow up till 2 weeks postpartum.
Exclusion Criteria: 1) Patients with H/O sensitivity to chlorhexidine 2) H/o skin infection /genital infection.
Results: The statistical analysis was done with the software-SPSS version 16. The following observations were taken for analysis- 1) post-partum fever 2) foul smelling lochia 3) Induration or infection at the incision site 4) need for prolonged antibiotics and prolonged hospital stay.
Conclusion: Chlorhexidene swab cleansing before C section was found to reduce post-partum endometritis in C-section patients and can be included as a cost-effective and an efficient infection control method.

Keywords: Pre-operative preparation, chlorhexidine, endometritis

Introduction

Direct maternal infections around the time of childbirth are responsible for around a tenth of all maternal deaths worldwide. Women who get peripartum infections are more likely to have significant morbidity and long-term impairments including chronic pelvic pain and Secondary infertility due to anatomical distortions. An estimated 1 million new borns die each year as a result of this [1].

Pre-existing maternal illnesses (e.g., malnutrition, diabetes, obesity, severe anaemia, bacterial vaginosis, and group B streptococcus infections), as well as prelabour membrane rupture and multiple births. Multiple vaginal examinations, manual placenta removal, operational vaginal birth, and caesarean section enhance the risk of maternal peripartum infections. As a result, initiatives to minimise maternal peripartum infections and their short- and long-term effects have focused on infection prevention and control [2].

Cesarean section is the most important risk factor for endometritis, as it occurs in 11% of sections following labour and 3% of electives. The incidence is 2-9 % more in C-section than labour naturalis [3, 5]. Prolonged hospitalisation, sepsis, peritonitis, and intrapelvic abscess are all consequences of endometritis [4].

Post-operative endometritis is principally due to ascending pathogens from the vagina and cervical canal. The altered pathological flora is usually polymicrobial and resistant to the usual prophylactic antibiotics used [6, 7, 8].

Cleaning the vaginal canal before surgery is not a new scientific topic. Vaginal washing was used before abdominal hysterectomy in the early 1970s, and it was found to lower the number of vaginal bacteria and the rate of post-operative infection [9]. Later, researchers looked at whether pre-cesarean cleaning using antiseptics could reduce post-cesarean infection. Antiseptics were employed in a variety of forms (e.g., povidone-iodine, metronidazole, and chlorhexidine), procedures (e.g., vaginal washing or skin scrub), and types (e.g., solutions or wipes) [10-13]. According to a comprehensive review, vaginal washing with chlorhexidine is quite safe, inexpensive, and simple to use [14]. Preparing the vaginal area with an antiseptic chemical could be viewed as intrusive procedure. In this study, adequate care has been taken for educating women about the benefits of vaginal preparation and safeguarding their safety and preserving the privacy. The method and timing of vaginal preparation should be used in a way that ensures the best results and in this study it is combined during Pre-operative preparation.

The disinfection is rapid, within ten minutes, making it potentially useful immediately before the caesarean delivery. More well-designed randomised clinical studies, according to the review's authors, are needed to evaluate that safe and valuable method. The authors of the current study were motivated by this to investigate the impact of preoperative vaginal washing with chlorhexidine antiseptic on post-caesarean section infection morbidity. Additionally, the American College of Obstetricians and Gynaecologists (ACOG) recently updated practice recommendations in September 2018 for infection prophylaxis on labor and delivery [7].

Aim: The purpose of this study is to see if preoperative vaginal cleaning with a 0.5% chlorhexidine gluconate solution can reduce the risk of postoperative caesarean section maternal infectious morbidities, specifically endometritis.

Objective: To recommend vaginal cleansing with chlorhexidine antiseptic solution as an accompaniment to the abdominal skin scrub and prophylactic antibiotic therapy, immediately prior to C-section for lowering endometrial exposure to bacteria.

Methodology

The study incorporated 50 AN patients who were scheduled for a C-section during the study period (01.12.2020 to 06.06.2021) into two groups A and B by Random sampling. Each pregnant woman scheduled for a C-section was interviewed when she arrived in the operation room waiting area. The study's goal and nature were defined, and eligible pregnant women giving informed written consent, only is included the group's assignment was determined at the same time. The standard pre-operative skin preparation, medicines, and prophylactic antibiotics were administered to both Group A, the control and Group -B, intervention group. Patients in Group –B received vaginal washing with chlorhexidine. A sterile bowl with 30 mL chlorhexidine 0.5 percent antiseptic solution with 2 sterile gauzes was used for vaginal disinfection. The area between the vaginal apex and the introitus was cleansed in a clockwise direction. The vaginal apex was cleansed first, then the four vaginal fornices, and finally the introitus, for 30 seconds before and after Foley catheterization.

Inclusion criteria

1) All women undergoing C section during the study period.
2) Those who give willingness to participate in study and for follow up till 2 weeks postpartum.

Exclusion criteria: Patients with

1. H/O sensitivity to chlorhexidine
2. H/O skin infection /genital infection.
3. H/O immune compromised status like Diabetes.
4. H/O Antepartum risk factors like Anaemia, Premature membrane rupture, Antepartum
5. Haemorrhage.
6. H/O prolonged intra-operative period & intra-op bleeding.

Definition of outcomes measured:

1) **Fever**: defined by a temperature of 38 degrees Celsius or higher, omitting the first day following caesarean delivery and any other causes of fever such as mastitis, urinary tract infection, or tonsillitis.
2) Lower abdominal pain and fundal tenderness, as well as one or more of rebound tenderness, tenderness with cervical motion, adnexal tenderness, foul-smelling lochia, and fever, were all signs of endometritis.
3) **Infection at the Site of incision**: It was detected by the appearance of erythema or the disruption of an abdominal incision, as well as purulent discharge from the incision site, which need antibiotics and wound care.

Data collection & Analysis of variables

Maternal age, weight and height with BMI, gestational age at the time of delivery, and parity were among the demographic factors studied. Details of the LSCS procedure, including the indication, duration, and length of stay in the hospital were also taken into contemplation. SPSS for Windows version 20.0 was used for all statistical analyses .The mean and standard deviation of all continuous values were calculated. Numbers and percentages were used to express categorical data. For two variables with continuous data, the comparisons were made using the Student's t-test. When comparing variables with categorical data, the Chi-square test was utilised. The threshold for statistical significance was established at $p < 0.05$.

Table 1: Gravida Distribution in both Groups

Group		Frequency	Percent
A	Primi	11	44.0
	2nd Gravida	13	52.0
	3rd Gravida	1	4.0
B	Primi	7	28.0
	2nd Gravida	17	68.0
	3rd Gravida	1	4.0

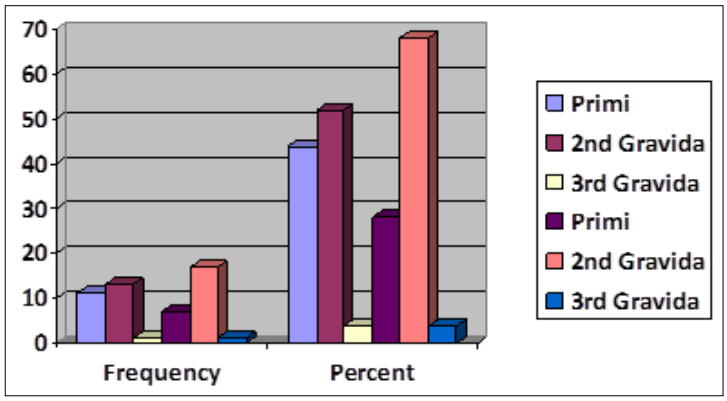

Fig 1: Gravida Distribution in both Groups

Table 2: Age wise distribution

Group		Frequency	Percent
A	21 - 25	13	52.0
	26 - 30	8	32.0
	>=31	4	16.0
B	21 - 25	8	32.0
	26 - 30	9	36.0
	>=31	5	20.0

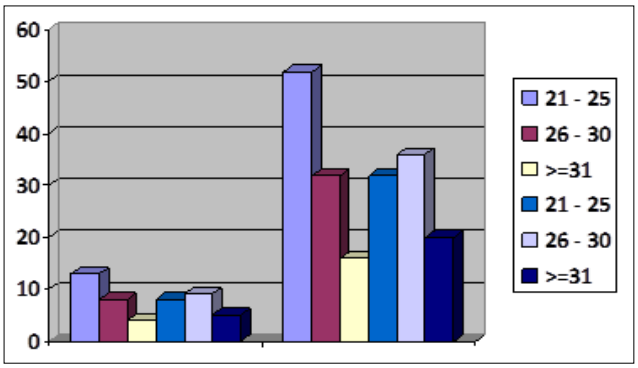

Fig 2: Age wise distribution

Table 1 shows the fundamental characteristics of the women who took part in the study. The research group had a mean age of 25.8 years, while the usual care group had a mean age of 26.7 years. In terms of maternal age, parity, gestational age at delivery, birth weight, indication, and duration of the CS, there were no statistically significant differences between the two groups, indicating that they were matched and homogeneous.

Table 3: Comparison of outcomes

Variable	Intervention Group		Control Group		P value	RR or CI
Postpartum fever	4	16%	11	44%	0.002	4.125 (1.092 to15.585)
Foul smelling lochia	3	12%	5	20%	0.440	1.833 (,387 to 8.674)
Wound infection	1	4%	10	40%	0.031	16 (1.855 to 137.974)

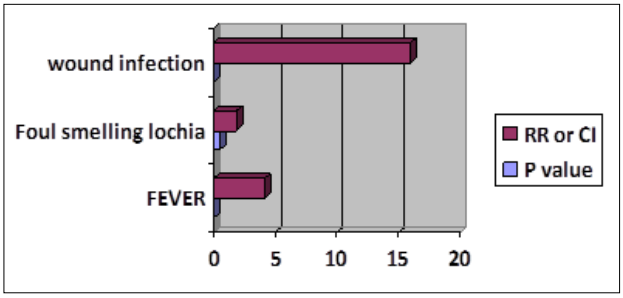

Fig 3: Statistical significance in outcomes

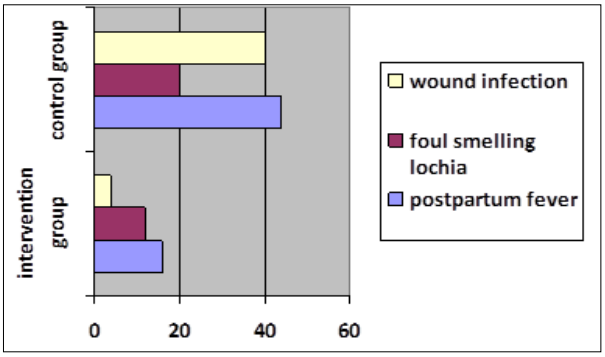

Fig 4: Comparison of infectious morbidities in both group

As shown in Figure 2. The endometritis rate, which was 16 percent in the interventional group versus 44 percent in the usual care group (p =.002), revealed statistically significant reduction in overall post Caesarean infectious morbidity (Figure 2). Wound infection (40 percent vs 4 percent; p =0.03) and surgical site infection (40 percent vs 4 percent; p =0.03) rates were vastly shorter in the interventional group than in the standard care group. The average length of hospital stay in the study and usual care groups was nearly identical (8.0 vs. 8.1 days), with no statistically significant difference.

Discussion

The influence of preoperative vaginal scrub with chlorhexidine wipes on post-caesarean infectious morbidities in 219 women undergoing elective CS at Suez Canal University Hospital in Ismailia, Egypt, was assessed in a randomised controlled trial, which validated the findings of the current study [15, 16]. Tewfik and coauthors (2015) found that vaginal cleaning with chlorhexidine solution before elective C-section reduced total post-LSCS infection morbidity in 47 women at Ain Shams University Maternity Hospital in Egypt. Chlorhexidine antiseptic's antibacterial action against a variety of biotrophic pathogens, including those connected to peripartum infections, may explain its favourable impact in decreasing cumulative infectious morbidity. It also has a longer delayed effect than other antiseptics, making it superior [18, 19]. This can be attributed to the small sample size.

In the present research, there was no substantial statistical distinction in hospital stay time between the two groups. Similarly, Ahmad and colleagues found no statistically significant difference between the two groups in terms of hospital stay length.

Chlorhexidine is well tolerated and has few adverse effects, according to the latest study. Chlorhexidine vaginal wipes at concentrations less than 1%, according to Wilson *et al*. (2004), do not induce unpleasant skin reactions and are not destroyed by organic molecules such as sweat [20-22]. Despite the fact that the

current investigators revealed that the study group patients had a lower rate of wound infection and febrile morbidity, the difference was small and inconsequential. Ahmed and coauthors found a non-significant decline in rates of febrile morbidity and wound infection when contrasting the chlorhexidine vaginal washing group to the control group [15]. The similarities in methodology between the current study and Ahmad *et al*. study may explain the agreement between the two analyses. Both studies were designed as randomised controlled trials, and the inclusion criteria were similar in both. Tewfik *et al*. (2015), on the other hand, discovered that the reduction in febrile morbidity among the vaginal scrub using chlorhexidine group is statistically significant, which could be due to the lower sample size.

Conclusion

When compared to saline or without cleansing before caesarean delivery, vaginal preparation with chlorhexidine solution minimises the incidence of post-cesarean endometritis. Chlorhexidine cleansing being a simple and relatively affordable intervention, can be given as a exhortation in maintaining Asepsis during C-section.

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