Original Article

Post-cesarean Wound Infection in Group Changing the entire Surgical team's Gloves Intraoperatively, after Delivery of the Placenta versus Control Group

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Abstract

Objective: To compare the post-cesarean wound infection in group changing the entire surgical team's gloves intraoperatively, after delivery of the placenta versus control group.

Methodology: This randomized controlled trial was conducted at obstetrics and Gynaecology unit 1, Liaquat University of Medical &Health and Sciences Jamshoro from December 2017 to June 2018. All the post-caesarean section patients of age 18-40 years, gestational age 32-40 weeks, and either of parity and booking status were included. A detailed history and examination were done. All patients were randomly grouped into two categories via the lottery method. In Group A cases, every surgical team member had changed surgical gloves following placenta delivery during the cesarean procedure, while in group-B cases; the surgical team did not change the gloves during cesarean procedure. All admitted patients were followed up to the first 07 days for post cesarean wound infection. All the information including with or without changes gloves and findings were documented in predesigned study proforma by the researcher. Data was analyzed via SPSS version 20.

Results: A total of 110 patients were studied in both groups. The mean age was 28.2±3.9 years in the gloves changing group and mean age was 30.2±4.1 years in control group. Surgical site infection was significantly high in control group as in 25.5% of the patient as compared to 5.5% in patients in the gloves changing group (p=0.003).

Conclusion: When the whole team replaced surgical gloves following placenta delivery, they had a better outcome in terms of reducing the proportion of wound infections following caesarean as compared to control group.

Keywords: Post-cesarean wound infection, changing gloves intra operatively, placenta delivery

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Introduction

Cesarean delivery has been claimed to be a commonest surgical procedures throughout the world. It is considered as the most important surgery of obstetrics conducted to save maternal lives as well as lives of their neonates. Pakistan is among those nations where the cesarean section rate has surprisingly expanded, during the previous 20 years.[1] Pakistan is a developing country with limited resources and a very high maternal mortality due to preventable pregnancy-related complications.[2] The most recent decades, there has been an increasing rate of C/sections. This has been a source of significant

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concern to medical services providers in several developed and developing nations. The concern comes from the way that cesarean sections are related to a fundamentally high risk of maternal complications and death as compared to normal vaginal deliveries.[3,4] Cesarean deliveries highly linked to surgical site infections which raise maternal complications, prolonged hospital stay, and also a significant factor of medical costs.[5] Evidence indicates that when vaginal bacterial flora is introduced to usually sterile conditions during caesarean section, they lead to infectious post-operative morbidity. Surgeon's gloves, which come into contact with the lower urogenital system during childbirth, maybe a major carrier of bacterial flora from the reproductive tract to the abdominal wall. Changing gloves following the delivery of a placenta and before abdominal wall closure in the course of caesarean section may reduce bacterial transmission between reproductive tract and the wound bed, lowering the risk of wound complications after caesarean section.[6,8,9] With the rise in caesarean section rate worldwide, post caesarean wound infections have become a significant health and economic burden. So, this study was carried out for the early detection of risks causing post cesarean wound infections and developing strategies to prevent such infections in the control group versus in group where every surgical team member changed gloves intraoperatively and following placenta delivery. This strategy can help in reducing the frequency of post cesarean wound infection and the maternal morbidity, medical cost and hospital stay associated with it. Previously post-operative wound infections are studied but very few study address the importance of intraoperative gloves changes, moreover because of the different body habitués, environment and dietary habits it is mandatory to conduct research in local population.

Methodology

This randomized controlled trial was conducted at Obstetrics and Gynaecology unit 1, Liaquat University of Medical & Health and Sciences, Jamshoro from December 2017 to June 2018. Non probability consecutive sampling technique was used. All the post caesarean women with age of 18-40 years, gestational age 32-40 weeks and either of parity and booking status were included.

All the anemic women, who had Chorioamnionitis, skin site infection prior to surgery, chronic liver disease, diabetes mellitus and obesity were excluded. Informed consent was taken from each patient. Complete clinical examination and medical history was taken from each patient. All patients were randomly grouped into two categories via the lottery method. In Group A, surgical team members changed their surgical gloves following placenta delivery during the cesarean procedure, while surgical team members in group B did not change gloves during the procedure. All admitted patients were followed up to the first 07 days for post cesarean wound infection. All the above-mentioned information including name, age, address, and type of procedure i.e. with or without changes gloves and findings were recorded in a predesigned proforma by the researcher. To avoid confounders and prejudice in the research findings, strict criteria of inclusion and exclusion were used. The collected data were analyzed by using SPSS version 20. Mean and standard deviation were computed for quantitative variables like age, parity and gestational age. Frequency and percentage were calculated for qualitative variables like diabetes, hypertension, and educational status, and SSI. Surgical site infection was compared between both groups. Effect modifiers including age, parity, and gestational age were controlled through stratification. Chi square test were applied, Post stratification keeping P value ≤ 0.05 as significant.

Results

A total of 110 patients were studied in both groups. Mean age was 28.2$\pm$3.9 years in the gloves changing group and mean age was 30.2$\pm$4.1 years in control group. Majority of patients were found with age group of 18 -30 years in both study groups with the statistically insignificant difference (p=0.674). According to gestational age, 29(52.7%) study subjects were with gestational age less than 36 weeks, 26(17.3%) were with gestational age 36 or more weeks in gloves changing group. While 32(58.2%) study subjects were with gestational age less than 36 weeks, 23(41.8%) were with gestational age 36 or more weeks. Majority of the patients were primiparous in both groups, findings were statistically non-significant of parity according to both groups (p=0.945). Educational status was statistically insignificant in both groups (p=0.556) and majority of the patients were illiterate in both groups (Table I)

Stratification for post caesarean section surgical site infection was statistically significant concerning age, gestational age and parity p-values were quite significant. Table. II

Table I: Demographic characteristic of the patients of both groups (n=110)

Variables		STUDY GROUPS		p-value
		Group A	Group B	
Age group	18-30 years	37/67.3%	40/72.7%	0.674
	31-40 years.	18/32.7%	15/27.3%	
Gestational age	<36 weeks	29/52.7%	32/58.2%	0.842
	≥36 weeks	26/47.3%	23/41.8%	
Parity	Primi Para	27/49.1%	27/49.1%	0.945
	Multi Para	21/38.2%	20/36.4%	
	Grand multi Para	07/12.7%	08/14.5%	
Educational status	Illiterate	29/52.7%	34/61.8%	0.556
	Primary to matric	17/30.9%	16/29.1%	
	Graduation	09/16.4%	05/9.1%	

Table II: Stratification for SSI in both study groups with respect to age, gestational age and parity (n=17)

Variables		SURGICAL SITE INFECTION		p-value
		Group A	Group B	
Age group	18-30 years	3	10	0.001
	31-40 years.	0	4	
Gestational age	<36 weeks	02	07	0.001
	≥36 weeks	01	07	
Parity	Primi Para	02	06	0.001
	Multi Para	01	06	
	Grand multi Para	07	08	

Surgical site infection was significantly high in control group as in 25.5% of the patient as compared to 5.5% in patients of gloves changing group (p=0.003). Figure 1.

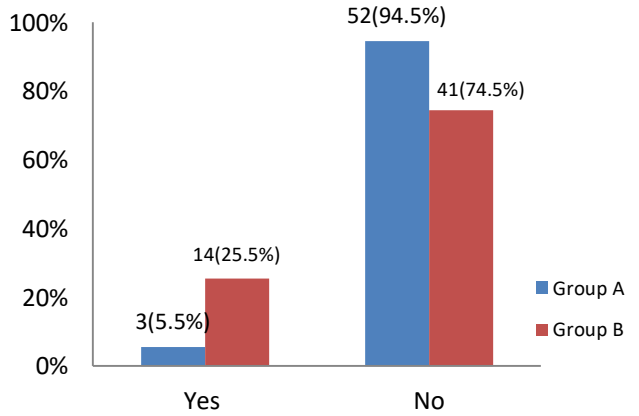

Figure 1. Comparison of surgical site infection (SSI) in both study groups (n=110)

Discussion

Wound infection is also a common cause of post-c-section morbidity. Prevention is not only preferable to cure, but it is also much more practical. Post-cesarean surgical site infection is a significant burden for the healthcare system, and its prevention should be a top priority in any underdeveloped country's healthcare system.[11] Wound infections are caused by a variety of factors. Some factors, such as the patient's characteristics, cannot be changed, but only a few others can. Vaginal bacterial flora transmission via the gloves of a surgeon who made an incision in a patient's abdominal wall may be a major cause of post-cesarean wound infection. However, in this study surgical site infection (SSI) was significantly high in the control group as in 25.5% of the patient as compared to 5.5% in patients in gloves changing group (p=0.003). Consistently Hameed N et al[12] reported that the rate of wound infection in changing gloves group was significantly decreased as 5.0% in contrast to those who did not change gloves as 18.8% (p=0.013). An international study by Scrafford J et al[13] reported that the post-operative infection rate was significantly lesser in the changing gloves group than in the control group (p= 0.008). However, as per recent meta-analysis and systematic review the updated research implies that the gloves changing during the cesarean section can minimize the likelihood of SSI significantly.[14]

Postoperative cesarean wound infection may be developed due to surgeon's gloves, subjected to the lower Urogenital System during childbirth, could be a significant driver of bacterial flora towards an abdominal wall of a patient. Changing gloves before the closure of abdominal wall during caesarean section can reduce bacterial transmission towards the wound bed and, as a result, the occurrence of wound complications after caesarean section may be reduced.[15]

In this study, the mean age was 28.2±3.9 years in gloves changing group, and mean age was 30.2±4.1 years in the control group and most of the women had gestational age ≤ 36 weeks in both study groups. Similarly, Hameed N et al[12] reported that the mean age of women of group A was 28.89±6.97 years and mean age in group B females was 29.23±6.65 years, while the average gestational age 38.60±1.47 weeks at the time of delivery in the patients of group A and 39.16±1.43 weeks of individuals of group B.

Consistently Devoor AK et al[15] reported that average age of study participants was particularly 25.0±4.0 years of group A, 23.0±3.3 years of group B and 24.0±4.1 years of the patients of control group. Identification of risk factors associated with post cesarean SSI development may help in explaining

modifiable points within obstetric care as well as minimize the prevalence of SSI. Previously, personal protective equipment (gloves and gowns) was not used by surgeons during operations. This allowed bacteria to spread from surgical team to patients and vice versa. When typical vaginal floral is added to the abdominal cavity in the course of a caesarean delivery, there is scientific proof that it leads to infectious post-operative morbidity. [13] In colorectal, urologic, and gynecologic oncologic procedures, the role of glove change during an intervention over infectious complications were examined both as a part of a surgical set or closing tray and a single procedure, with mixed outcomes.[16,17] Though, the whole surgical team involved in the surgical procedure changing gloves following placental delivery greatly decreases the incidence of wound infection following surgery, excluding females with other higher risks of development of infectious post-cesarean morbidity.

Conclusion

In comparison to the control group, the glove changing group had superior outcomes in terms of reducing the amount of post-cesarean section wound infections by making the whole team change surgical gloves following the placental delivery.

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