Vaginal Preparation with Antiseptic Solution (Povidone iodine 10%) before Cesarean Section for Preventing Postpartum Infections: A Prospective Observative Cohort Study

Thesis

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List of Abbreviations

Abb.	Full term
ACOG	*American Congress of Obstetricians and Gynecologists*
BV	*Bacterial vaginosis*
CRF	*Case record data form*
CS	*Cesarean section*
CT	*Computed tomography*
DSPT	*Deep septic pelvic thrombophlebitis*
EUS	*Endoscopic ultrasound*
INN	*Is spelled polihexanide*
IQR	*Interquartile range*
IV	*Intravenous*
MRI	*Magnetic resonance imaging*
MRSA	*Methicillin-resistant type*
OVT	*Ovarian vein thrombophlebitis*
PEACH	*PID Evaluation and Clinical Health*
PHMB	*Polyhexanide polyhexamethylene biguanide*
PVP-I	*Povidone-iodine*
SPSS	*Statistical package for social science*
SPT	*Septic pelvic thrombophlebitis*
SSI	*Surgical site infections*
TMP/SMX	*Trimethoprim/sulfamethoxazole*
tPA	*Tissue plasminogen activator*
UTI	*Urinary tract infection*

INTRODUCTION

Cesarean section is one of the most frequently performed surgical procedures by the obstetricians. After 13 years of consecutive increases, the total U.S cesarean delivery rate reached a high of 32.9% of all birth in 2009. The total cesarean delivery rate declined in 2010 to 32.8% and was stable for 2011 and 2012 ***(Martin et al., 2013; Haas et al., 2013).***

Endometritis, an infection of the uterus in the postpartum period, the patient complain to (fever, offensive vaginal discharge and lower abdominal pain), can complicate the postoperative course of a cesarean delivery 6% to27% of the time ***(Guzman, 2014; Smail, 2014).***

This complication, up to10 times more frequent after a cesarean delivery than after vaginal delivery, can lead to serious complications of bacterial infection in the blood(10% to20%) peritonitis (general infection in the abdominal cavity) intra-abdominal abscess (cavity filled with infected material) and sepsis ***(Mac keen, 2015).*** Additionally, cesarean deliveries are frequently complicated by maternal fever and wound complications including seroma (fluid collection under the skin), infection, and separation ***(Zuarez-Easton, 2017).*** These morbidities can lead to significant delay in a return to normal function.

Despite the wide spread use of prophylactic antibiotic, post operative infection remains a significant complication of caesarean delivery. These complication included endometritis, maternal fever, wound infection and pelvic abscess. Endometritis, is an infection of uterus in the post partum period which complicates 6-27% of the cases known clinically by fever 38.4°C and greater with uterine tenderness and foul smelling lochia requiring broad spectrum intravenous antibiotic administration ***(Reid et al., 2011).***

The most recognized risk factor for developing post caesarean infectious morbidity included repeated vaginal examinations, prolonged rupture of membranes, prolonged labour and failure to use prophylactic antibiotic ***(Staee et al., 2012).***

Cleansing of all body surface that could be in contact during a surgical procedure tends to minimize the presence of micro-organism and risk of infection ***(Starr et al., 2012).***

Iodine is commonly used as an antiseptic agent clinically. Iodine is usually formulated as an iodophor, which consists of iodine combined with a carrier molecule. This formulation increases the solubility of iodine and provides a reservoir for sustained release. The most commonly used iodophor is povidone iodine which is a 10% iodophor solution that contains 1% available iodine. Iodine molecules penetrate microbial cell walls and cause oxidation of cysteine, iodination

of amino acids and unsaturated fatty acids. This leads to reduced protein synthesis and bacterial cell wall damage ***(Kam and Lim, 2008).***

Conducted an observational case control study to evaluate the effect of preoperative vaginal cleansing on post cesarean infectious morbidity and found significant reduction of post caesarean endometritis in patient who were in active labour and with ruptured membranes ***(Shahneela et al., 2011).***

AIM OF THE WORK

The research hypothesis: The use of antiseptic solution for vaginal preparation before cesarean section is not effective in reducing postpartum infections.

The research question*:* Does vaginal preparation with antiseptic solution before cesarean section reduces postpartum infections.

The aim of the study: To asses the effect of vaginal preparation with antiseptic solution before cesarean section in reducing postpartum infections.

Chapter 1

POST-PARTUM INFECTIONS

Puerperal infection remains a major cause of maternal morbidity and mortality. The primary risk factor is cesarean delivery, which increases the risk 5- to 20-fold than normal vaginal delivery. Cesarean delivery is the single most important risk factor for puerperal infection ***(Lee and Norwitz, 2012).***

Post-partum infection includes:

Wound infection:

Cesarean section (CS) wound infections represent a substantial burden to the health system and the prevention of such infections should be a healthcare priority in developing and developed countries ***(Nwankwo et al., 2012).*** The global estimates of surgical site infections (SSI) are from 0.5–15% ***(Arora, 2018).*** Surgical site infection can be attributed to a perioperative bacterial load in the tissue at the site of surgery and the diminished integrity of the host's defenses ***(Sachdeva and Hamdi, 2014).***

It is the third most common type of nosocomial infection, accounting for 14–16%. Cesarean section surgery has a 5–20 times higher risk of postpartum infection as compared to vaginal deliveries ***(Gregson & Smyth, 2011).***

Atiology:

The most common pathogens are *Staphylococcus aureus*, streptococci, aerobic Gram-negative bacilli(such as E.coli, K. pneumoniae, and Proteus species) and anaerobes(*Pseudomonas aeruginosa*) ***(Krönke and Krut, 2006).***

Staphylococcus is the most common cause of nosocomial infections and is often the cause of postsurgical wound infections; the Gram-positive *cocci* are often found living on the skin and in the nose ***(Shittu et al., 20١٢).***

Risk factor:

Some women are more likely than others to get a Cesarean section wound infection. Risk factors can include:

- **Postoperative wound haematoma:** is the strongest independent risk factor for surgical site infection**.** This suggests lapses in complete haemostasis during the wound closure as a haematoma may provide a medium for bacterial growth. The meticulous closure of potential spaces and good haemostatic techniques would reduce

the frequency of haematomas leading to wound infections ***(Sachdeva and Hamdi, 2014).***

Obesity: (body mass index of 30 or more), obese women are higher than that of the general population due to the poor penetration of antibiotics into the skin because of the avascularity of adipose tissue. Moreover, obesity places greater mechanical stress on the wound and thus delays healing**.** Women should be encouraged to eat healthily, have a well-balanced diet and take adequate exercise to avoid the risks of surgical site infection ***(Dhar et al., 2014).***

Diabetes: The incidence of infections in patients with gestational diabetes, either controlled by diet or insulin, was significantly higher (15.16%) than among the non-diabetic patients (5.45%). In other studies, the incidence of wound infections was noted to be six times higher in diabetic patients. Uncontrolled blood glucose levels increase the infection rate and impairs wound healing as it enables the leukocytes to control the harmful proliferation of bacteria ***(Nwankwo et al., 2012).***

Chorioamnionitis: (infection of the amniotic fluid and fetal membrane) during labor. As the protective effect of the intact fetal membranes is lost, The length of time between the rupture of the membranes and surgical intervention influences the CS wound infection rate as once the membranes have ruptured, the amniotic fluid is no longer sterile and may act as a

transport medium, allowing bacteria to come into contact with any uterine and/or skin incisions ***(Bava and Nandanwar, 2015).***

Long lobour or surgery: Prolonged labour, after a full trial of vaginal delivery, was observed in 9.47% cases of wound infections. Frequent vaginal examinations may be a contributory factor for the increased infection rate in such cases ***(Ezechi et al., 2009).***

Others: Excessive blood loss during surgery, poor prenatal care (few visits), previous cesarean sections, lack of cautionary antibiotics or pre-incision antimicrobial care, immunodeficiency disorder, use of systemic corticosteroids or smoking ***(Jamie & Duff, 20١٢).***

Pathogenesis:

Wound infections may take one of two forms:

Incisional abscess:

Patients with this condition typically have erythema and warmth at the margins of the wound and purulent drainage from the incision itself ***(Ling & Duff, 2001).***

Wound cellulitis:

Patients with this condition have an intense erythematous reaction that spreads outward from the wound. The affected