# Preparation of vagina with povidone iodine before caesarean section to reduce postoperative morbidity

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#### Abstract

Background: Clinical practice of medicine have used numerous strategies to combat wound infections, including topical and systemic administration of antibiotics, and various antiseptic agents such as hypochlorite and hydrogen peroxide have been placed on wounds to kill bacteria or inhibit their growth. A commonly used antimicrobial agent is povidone-iodine, a complex of iodine, the bactericidal component, with polyvinylpyrrolidone (povidone), a synthetic polymer. Povidoneiodine is available as a surgical scrub or skin cleanser with a detergent base or in other forms, the effect of povidoneiodine on several of the cellular components of the wound healing mechanism. Methodology: It was Interventional and randomised, Parallel Assignment study. The study was conducted among the women undergoing elective and emergency caesarean section in our Darbhanga Medical College and Hospital. The recruitment target is being kept at 50 subjects per group. The study period was January 2018 to May 2019. Caesarean section was done in the department of Obstetrics and Gynaecology of Darbhanga Medical College and Hospital. Results: The age of our study subjects ranged between 18-33 years. The mean age of the case and control group was  $25.700 \pm 2.45$  and  $26.300 \pm 2.80$  respectively. Above analysis for age distribution in both groups we found no significance (p value 0.36). The mean intra operative time of both groups is mentioned. The mean value of intra operative time for case and control group was  $37.040 \pm 1.92$  and  $37.020 \pm 1.95$ . Above analysing the mean intra operative time of two groups we found no statistical significance (p value = 0.762). The common morbidity was fever involving total 18 patients among them 4 belonged to case group and 12 belonged to control group followed by endometritis involving 13 patients among them 03 belonged to case group and 10 belonged to control group; wound infection involving 16 patients among them 2 belonged to case group and 14 belonged to control group, the least common morbidity was sepsis found in 10 patients among them 3 belonged to case group and 7 belonged to control group. Statistical significance found in wound infection and endometritis while analysing. Conclusion: We observed the occurrence of endometritis can be reduced while preparing the vagina preoperatively with Povidone Iodine compared to those who received vaginal scrub only. Key Word: povidone iodine.

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# INTRODUCTION

A surgical site infection is defined as an infection which occurs at the incision / operative site (including drains) within 30 days after surgical operation if no implant is left in place / within 1 year if an implant is left in place. The infection must appear to be related to the surgical procedure<sup>1</sup>. According to CDC's National Nosocomial Infection Surveillance system 38% of all nosocomial infections in surgical patients are surgical site infections (SSI). They constitute third most common nosocomial infection. Surgical site infections delay recovery, prolong hospitalization or outpatient treatment, may necessitate readmission, increase hospital bills as well as other morbidities and mortality<sup>2</sup>, thus are responsible for significant psychological and economic burden to the society. The rate of surgical site infection after caesarean section range from 3% to 15%, depending on the surveillance methods used to identify infections, the patient population, and the use of antibiotic prophylaxis<sup>3-5</sup>.

How to cite this article: Ranu Singh Kushwaha, Khushboo Yasmin. Preparation of vagina with povidone iodine before caesarean section to reduce postoperative morbidity. *MedPulse International Journal of Gynaecology*. June 2020; 14(3): 79-83. http://medpulse.in/Gynaecology/index.php The causes of surgical site infection following caesarean section are universal with only slight regional variations<sup>6</sup>. Intrinsic factors are patient related and include age, obesity, underlying medical conditions like diabetes mellitus, hypertension, asthma, immunocompromised states like HIV infection, hypoalbuminemia, hyperlipidemia, anemia. Extrinsic factors relate to the management and care, which include preoperative preparation of the patient (part preparation and skin asepsis), type of procedure (emergency/elective), type of anaesthesia (regional/general), type of skin incision (horizontal/vertical), method of skin closure, type of suture used (mono/ polyfilament) or use of staples, antibiotic prophylaxis, length of time membranes ruptured prior to operation, manual extraction of placenta, chorioamnionitis, number of vaginal examinations carried out before surgery, duration of operation, transfusion of blood products, grade operator of (consultant/registrar/senior resident), previous caesarean section, and environment of the operating room<sup>7</sup>. Knowledge of risk factors associated with surgical site infection is essential to develop targeted prevention strategies and reduce the risk of infection. Surgical site infection frequently affects the superficial tissues, but some serious infections affect the deeper tissues or other parts of the body manipulated during the procedure. Majority of surgical site infections become apparent within 30 days of an operative procedure and most often between the 5<sup>th</sup> and 10<sup>th</sup> postoperative days. The CDC definition<sup>8</sup> describes three levels of surgical site infection; 'Superficial incisional' affecting the skin and subcutaneous tissue, 'Deep incisional', which affects the fascial and muscle lavers and 'Organ or Space infection' which involves any part in the body other than the incision that is opened or manipulated during the surgical procedure. This review found that cleansing the vagina with an antiseptic solution immediately before the cesarean delivery reduced the risk of post-cesarean infection of the uterus (womb) (low quality of evidence). The benefit was greater if the woman's water had already broken (the membranes had ruptured) or if they were already in labor at the time of the cesarean delivery. This review did not find that vaginal cleansing reduced the number of women experiencing fever or wound complications after cesarean delivery. The antiseptic was povidone-iodine, and no adverse events such as allergy or irritation were noted in any of the seven randomized trials, reporting on 2635 women, from vaginal preparation solution.

# **METHODS**

It was Interventional and randomised, Parallel Assignment study. The study was conducted among the women undergoing elective and emergency caesarean section in our Darbhanga Medical College and Hospital. The recruitment target is being kept at 50 subjects per group. The study period was January 2018 to May 2019. Caesarean section was done in the department of Obstetrics and Gynaecology of Darbhanga Medical College and Hospital.

## **Inclusion criteria:**

The study was open to all pregnant women who were to undergo a cesarean delivery over age 18 years and able to give informed consent.

## **Exclusion criteria:**

Exclusion from enrolment was related solely to medical contraindications to the vaginal preparation required for the trial, including :

- 1. Highly emergent caesarean
- 2. Planned cesarean hysterectomy
- 3. Allergy to povidone iodine, iodine, or shellfish
- 4. Bleeding placenta previa;
- 5. Active genital herpes.
- 6. Pregnancy with diabetes

## Sample Size:

Sample size estimation was done based on a 10% absolute difference in fever rate between the two study groups, assuming 15% fever incidence in control group and 5% in povidone iodine group. It was estimated that 141 subjects would be required per group in order to detect such a difference with 80% power and 5% probability of type I error. Assuming a 15% non-evaluable record rate, the recruitment target is being kept at 50 subjects per group

**Case group:** The intervention group was received vaginal scrub before caesarean section. The vaginal scrub was consisting of 3 sponge sticks soaked in 5% povidoneiodine. The vaginal scrub encompassed the vaginal apex to the introitus with attention to the anterior, posterior, and lateral walls including all fornices.

**Control group:** The control group was received the standard abdominal scrub, only, without the vaginal preparation with povidone iodine

## **Outcome definition and parameters:**

**Fever** : defined as temperature of 38°C or greater excluding the first day after caesarean.

**Endometritis:** defined as uterine tenderness plus postoperative feverrequiring additional antibiotic administration.

**Wound complications:** defined as incisional infection requiring antibiotics, separation, seroma, hematoma, or requirement for debridement. These were clinical diagnoses and require documentation by the care provider inthe chart. Chorioamnionitis was defined as fever (defined by the manifestation of a maternal temperature greater than 38°C) during labor along with clinicalsigns of infection (fundal tenderness, tachycardia, purulent lochia, etc)

# RESULTS

	Та	Table 1: Distribution of age among case and control group								
	Age	e Ca	se group (n=50) Control group p				p Value	:		
	40.22			(n		50)	0.265			
	18 - 33	years N	/iean	SD +2 726	IVIEan	5D +2.66	0.365			
		Ζ.	5.759	±2.720	25.945	±2.00				
	Table 2: Preoperative analysis									
	Gestational age Case group				Control group p V			ie		
	at de	livery	1)	า=50)	(	n=50)				
	(We	eks)	Mean	SD	Mean	n SD	0.087	7		
	_		39.332	2 ±0.88	39.230	6 ±1.06	0.057			
	Ра	rity Mi	1.700	±0.67	1.740	0 ±0.69	0.95:	5 7		
			20.432	12.15	29.100	5 11.78	0.107			
	Table: 3. Distribution of Labour status (b) among case and control group									
_	Labou	ır status		Case g	roup	oup Control g		p Valu	ie	
				(n=5	0)	(n=50	50)			
_				Mean	SD	Mean	SD			
	Pelvic Ex	amination		5.210	±1.15	4.800	±1.16	0.64		
	Length of mem	hbranes rup	otured	7.180	±1.49	7.800	±1.22	0.03		
-	(⊓	iour)								
	Table	e: 4: Intra-o	perative	analysis a	mong case	e and contr	ol group			
Intra-operative Time (min) Case group Control group							)	p Value		
			(n=50)			(n=50)				
			Ν	/lean	SD	Mea	ר SE	)		
			3	7.040	±1.92	37.02	0 ±1.	95	0.76	
Intra-	operative blood	loss (ml)	68	8.600	±68.49	9 701.80	00 ±71	.41	070	
	Table: 5: Pr	ostonerativ	e infectio	ous morbid	ities amor	ng Case and	Control	roup		
	Infectious morbidities Case grou					Control gro		Value		
				(n=50)		(n=50)				
			No	Percenta	ge No	Percen	tage			
	Feve	r	4	8	12	24		0.02	_	
	Seps	is	03	6	07	14		0.15		
	Wound In	fection	02	4	14	28		0.01		
	Endome	tritis	3	6	10	20		0.03	_	
	Tal	nle: 6 Neou	natal out	comes amo	ng Case a	and Control	group			
N	eonatal	Ca	se group	(n=9)		Control gro	oup (n=15)	)	p Value	
οι	utcomes	Mea	1	SD		Mean	SD	)		
Birt	th weight	3001.0	47	±22.25	29	975.114	±19.	67	0.06	
	(gm)									
Apgar s	core at 1 min	า 8.222		±0.77	8.321		±0.7	'9	0.86	
5 min	Apgar score	9.204		±0.55		9.546		±0.67		
NICU le	length of stay 6.200		±1.11	6.240		±1.17		0.41		
	(Days)			<b>.</b> .		(	_			
	_	No of Pat	ients	Percentag	e No c	of Patients	Percen	tage	p Value	
Apga	ar score </td <td>4</td> <td></td> <td>8</td> <td></td> <td>ь 21</td> <td>12</td> <td></td> <td>0.67</td>	4		8		ь 21	12		0.67	
NICU	Admission	12		24		21	42		0.23	

# DISCUSSION

# Pre operative analysis:

The age of our study subjects ranged between 18-33 years. The mean age of the case and control group was 25.700  $\pm 2.45$  and  $26.300 \pm 2.80$  respectively. Above analysis for

age distribution in both groups we found no significance (p value 0.36).

Pre portative analysis of both case and control group and their comparison is tabulated in this section. In this study, mean gestational age of both case and control group at the

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time of delivery. The mean gestational age of case and control group was  $39.332\pm0.88$  and  $39.236\pm1.06$  respectively. While analyzing gestational age in both groups we found no statistical significance (p value = 0.08).

We have found the mean and SD value of BMI for case and control group is  $26.432 \pm 2.13$  and  $29.180 \pm 1.78$ respectively. Above analysing the mean BMI we found no statistical significance.

The mean number of pelvic examination for case and control group was  $5.210 \pm 1.15$  and  $4.800 \pm 1.16$  respectively. The p value (0.64) we found was no statistically insignificant. The mean duration of membrane rupture for case and control group was  $7.180 \pm 1.49$  and  $7.800\pm 1.22$  respectively. While analysing the duration of membrane rupture we found statistical significance (p value = 0.039).

Recent studies have investigated specific preoperative interventions to decrease the risk of postcesarean endometritis. One published study also investigated the use of preoperative vaginal preparation with povidone-iodine before cesarean delivery.

Reid *et al.*<sup>9</sup> reported that vaginal preparation did not affect the incidence of postoperative fever, endometritis, or wound infection. However, that study did not address several potential risks for increased exposure to infection, specifically, a history of antenatal genitourinary infection, use of intrapartum internal monitors, severe anemia, or presence of obesity.

## Intra operative analysis

The mean intra operative time of both groups is mentioned. The mean value of intra operative time for case and control group was  $37.040 \pm 1.92$  and  $37.020 \pm 1.95$ . Above analysing the mean intra operative time of two groups we found no statistical significance (p value = 0.762).

We shows the mean intra operative blood loss level in case and control group. The mean intra operative blood loss level for case and control group was  $688.600 \pm 68.49$  and  $701.800 \pm 71.41$  While analysing the p value (0.707) we found no statistical significance.

## Post operative analysis

In our study, the common morbidity was fever involving total 18 patients among them 4 belonged to case group and 12 belonged to control group followed by endometritis involving 13 patients among them 03 belonged to case group and 10 belonged to control group; wound infection involving 16 patients among them 2 belonged to case group and 14 belonged to control group. the least common morbidity was sepsis found in 10 patients among them 3 belonged to case group and 7 belonged to control group. Statistical significance found in wound infection and endometritis while analysing.

Osborne and Wright (1977)<sup>10</sup> showed that povidone-iodine scrub could reduce 48% of vaginal bacteria. Vaginal scrub can reduce anaerobic Gram-positive rods, Gram-negative rods and some anaerobes and facultative coccus, specifically enterococci.

Our findings are in agreement with Guzman and colleagues  $(2002)^{11}$ , who demonstrated that vaginal preparation prior to caesarean section can reduce endometritis (p50.04),

We confirmed the study of Starr *et al.*  $(2005)^{12}$  that vaginal scrub with povidone-iodine prior to operation can reduce endometritis. Our findings are in accordance with Eason and colleagues' (2004)<sup>13</sup> study on 1,570 TAHs, that the risk of pelvic abscesses was reduced by vaginal povidoneiodine gel use. Reid et al.9 reported that vaginal preparation did not affect the incidence of postoperative fever, endometritis, or wound infection. However, that study did not address several potential risks for increased exposure infection, specifically, a history of antenatal genitourinary infection, use of intrapartum internal monitors, severe anemia, or presence of diabetes mellitus or obesity. Also, that study did not indicate whether all participants received parenteral prophylactic antibiotic at the time of umbilical cord clamping. vaginal antiseptic preparation using povidone iodine was used prior to cesarean section procedures and was found to reduce the risk of postpartum endometritis (Haas et al., 2014)<sup>14</sup>. Hass and Co- workers concluded that vaginal preparation with povidone-iodine solution immediately before cesarean delivery reduces the risk of post-operative endometritis (Haas et al., 2014)<sup>14</sup> Neonatal outcome of both groups is mentioned. Mean birth weight of newborns of case and control group was 3001.047 ±22.25 and 2975.114 ±19.67 respectively with ap value of 0.06 while analysing which is statistically insignificant. Total 24 newborns had a admission at NICU among them 9 belonged to case group and 15 belonged to control group. While analysing we found the p value (0.06) statistically insignificant. Mean Apgar score at 1 minute for case and control group was 8.222±0.77 and 8.321±0.79 respectively with a p value of 0.86 which is statistically not significant. The mean Apgar score at 5 minutes was 9.240  $\pm 0.55$  and 9.456  $\pm 0.67$  with a p value of 0.17 which is statistically insignificant. <7Apgar score was observed in 10 newborns among them 4 belonged to case group and 6 belonged to control group.

## CONCLUSION

Our study showed the benefit of a preoperative vaginal preparation just before caesarean delivery. The incidence of post-caesarean endometritis significantly decreased in those subjects who were scrubbed with both abdominal and vaginal povidone-iodine, prepared with those who received a standard abdominal scrub alone. Vaginal povidone-iodine preparation may reduce the occurrence of post-caesarean wound infection and endometritis.

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